

TRANSACTIONS

OF THE

LINNEAN SOCIETY.

VOL. V.

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OF THE

LINNEAN SOCIETY.

VOLUME V.

LONDON:

PRINTED BY J. DAVIS, CHANCERY-LANE.

SOLD AT THE SOCIETY'S HOUSE, NO. 10. PANTON-SQUARE, COVENTRY-STREET;
AND BY JOHN WHITE, FLEET-STREET.

M.DCCC.

6

TRANSACTIONS

Jos: Banks

OF THE

VOLUME

LONDON

PRINTED BY J. DAVIS, CHURCHILL

SOLD AT THE SOCIETY'S HOUSE, NO. 10, PATENT-SQUARE, COVENTRY-STREET,

AND BY JOHN WHITE, FLEET-STREET,

M.DCCC.

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TRANSACTIONS

OF THE

LINNEAN SOCIETY.

I. *Descriptions of some minute British Shells. By the late John Adams, Esq. F. L. S.*

Read February 6, 1798.

I BEG to lay before the Linnean Society the specific characters, with additional observations and drawings, of some minute Shells, which have fallen under my observation since my last paper on this subject.

Pembroke, Jan. 14, 1798.

BULLA.

truncata. 1. B. testâ subovali apice truncatâ.

TAB. I. fig. 1, 2.

Sand at the Wash, rare.

Obs. Colour white, opaque.

denticulata. 2. B. testâ oblongâ subæquali obtusâ lævi, aperturâ ad apicem denticulâ acutissimâ.

TAB. I. fig. 3, 4, 5.

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B

Sand

Sand at the Wash, not common.

Obs. Shell pellucid, white.

punctata. 3. *B.* testâ oblongâ subæquali transverse punctatâ.

TAB. I. *fig.* 6, 7, 8.

South Sands at Tenbigh, very rare.

Obs. Shell pellucid, with distant longitudinal striæ.

emarginata. 4. *B.* testâ gibbâ, aperturâ emarginatâ.

TAB. I. *fig.* 9, 10, 11.

Obs. Shell pellucid, smooth; lip subarcuated. *B. emarginata*, *punctata*, and *denticulata*, agree in their general habit; and *truncata* is most nearly allied to *cylindrica*.

TURBO.

trifasciatus. 1. *T.* testâ lævi quinque anfractibus subobsoletis fasciatis, aperturâ ovali.

TAB. I. *fig.* 12, 13.

Sand at the Wash.

Obs. Shell pellucid, imperforated, whitish, with two transverse red bands on the first spire, and one on the second.

membrana- 2. *T.* testâ lævi quinque anfractibus obliquè fasciatis, *ceus.* aperturâ subovali.

TAB. I. *fig.* 14, 15.

Sand at the Wash.

Obs. Colour yellowish brown, thin, pellucid, with oblique

oblique yellow-brown stripes, imperforated; readily distinguished by its membranaceous appearance.

interruptus. 3. *T. testâ lævi quinque anfractibus subobtusis, aperturâ subrotundâ.*

TAB. I. *fig.* 16, 17.

Sand at the Wash.

Obs. Shell glossy, pellucid, white, imperforated; spires with interrupted longitudinal bands of a rich ochreous colour.

subrufus. 4. *T. testâ lævi quinque anfractibus supernè subangulatis.*

TAB. I. *fig.* 18, 19.

Lenny Bay.

Obs. Shell opaque; colour dull red; upper part of each spire marked with a white transverse band.

HELIX.

fasciata. 1. *H. testâ lævi tribus anfractibus, primo ventricosiore, subumbilicatâ, aperturâ ampliata.*

TAB. I. *fig.* 20, 21.

Sand at the Wash. Tenbigh.

Obs. This delicate species is pellucid, white; first spire marked with three transverse belts of a rich marone colour, the middle one broad, the lateral ones narrow.

nitidissima. 2. *H. testâ duobus anfractibus, subtilissimè transverse striatâ.*

TAB. I. *fig.* 22, 23, 24.

Obs. Corneous, pellucid, umbilicated; easily distinguished by the uncommon brilliancy of its glossiness.

bicolor. 3. *H. testâ lævi duobus anfractibus, vix umbilicatâ.*

TAB. I. *fig.* 25, 26, 27.

Tenbigh.

Obs. This species differs from the preceding, to which it is nearly allied in other respects, in being perfectly smooth, devoid entirely of any glossiness, and in having the inside of the shell white.

SERPULA.

ovalis. 1. *S. testâ subovali imperforatâ.*

TAB. I. *fig.* 28, 29, 30.

Tenbigh, common.

Obs. This species agrees nearly with *fig. 1. pl. 1. Walker's Minute Shells*, but differs evidently in never being perforated.

reflexa. 2. *S. testâ regulari rotundâ, aperturæ margini reflexâ.*

TAB. I. *fig.* 31, 32.

Sand at the Wash.

Obs. Glossy, white, perforated; aperture above the plane of the spire.

cornea.

cornea.

3. *S. testâ regulari rotundâ pellucidâ, tribus anfractibus.*

TAB. I. *fig. 33, 34, 35.*

Sand at the Wash.

Obs. Brownish horn-colour.

EXPLANATION OF TAB. I.

Fig. 1. *Bulla truncata*, magnified.

2. ————, natural size.

3. *Bulla denticulata*, upper side magnified.

4. ————, natural size.

5. ————, under side magnified.

6. *Bulla punctata*, upper side magnified.

7. ————, natural size.

8. ————, under side magnified.

9. *Bulla emarginata*, upper side magnified.

10. ————, natural size.

11. ————, under side magnified.

12. *Turbo trifasciatus*, magnified.

13. ————, natural size.

14. *Turbo membranaceus*, magnified.

15. ————, natural size.

16. *Turbo interruptus*, magnified.

17. ————, natural size.

18. *Turbo subrufus*, magnified.

19. ————, natural size.

20. *Helix fasciata*, magnified.

21. ————, natural size.

Fig. 22.

Fig. 22. *Helix nitidissima*, upper side magnified.

23. —————, natural size.

24. —————, under side magnified.

25. *Helix bicolor*, upper side magnified.

26. —————, natural size.

27. —————, under side magnified.

28. *Serpula ovalis*, upper side magnified.

29. —————, natural size.

30. —————, under side magnified.

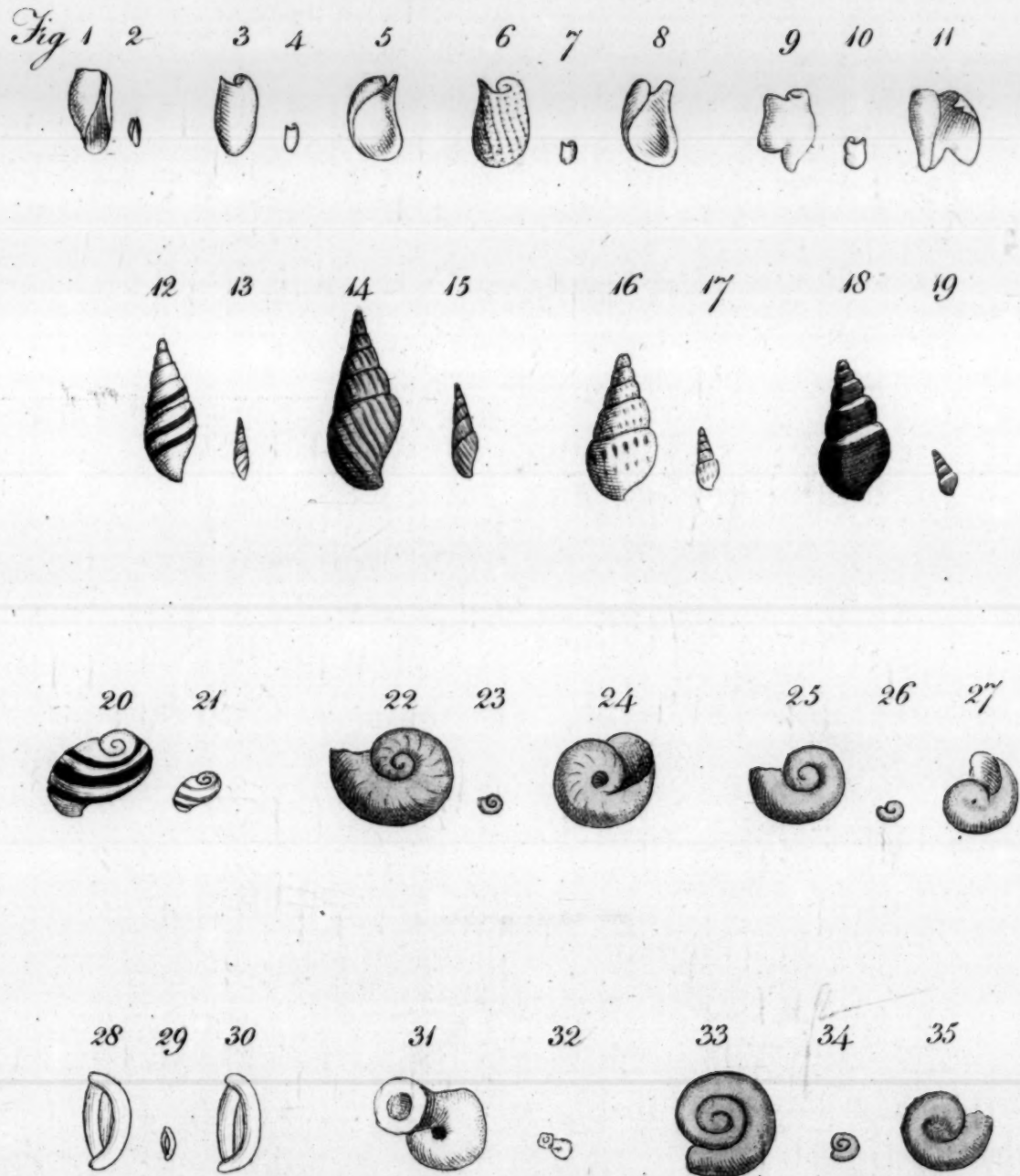
31. *Serpula reflexa*, magnified.

32. —————, natural size.

33. *Serpula cornea*, upper side magnified.

34. —————, natural size.

35. —————, under side magnified.





II. *Descriptions of some Marine Animals found on the Coast of Wales.*
By the late John Adams, Esq. F.L.S.

Read February 6, 1798.

PHALANGIUM.

1. *grossipes*. **P** CORPORE minuto cylindrico, humeris tuberculato, pedibus longissimis. *Linn. Syst. Nat.*
Ed. 13. p. 1027.

Milford Haven.

Obs. To the minute and accurate description given in the *Systema Naturæ* I can have nothing to add, except that its colour is a dirty red.

2. *hirsutum*. P. corpore subplano decemangulo.

TAB. II. *fig.* 1, 2.

Milford Haven. Tenbigh.

Obs. Body oval with ten angles, and marked with a transverse band near the centre; antennæ ferrated on the interior side; feet eight, hairy; tail cylindrical, obtuse; colour palish brown; length $\frac{1}{3}$ inch.

ONISCUS.

1. *bidentatus*. O. abdomine nudo, caudâ obtusissimâ, squamâ ultimâ bidentatâ.

TAB. II. fig. 3, 4.

Milford Haven.

Obs. Length $\frac{1}{2}$ inch; upper side marked with six transverse rows of ochreous spots; scales seven, the last with two teeth, which readily distinguishes this species.

NEREIS.

1. *viridis*. N. viridis filiformis segmentis CXXX. Linn. Syst. Nat. Ed. 13. p. 1086.

Amongst young plants of the *Fucus pinnatifidus* at Tenbigh.

Obs. Length $2\frac{1}{4}$ inches.

ACTINIA..

1. *maculata*. A. coralliflora, tentaculis numerosissimis retractilibus brevibus albis.

Milford Haven, surrounding the apertures of deserted shells of the *Murex despectus*.

Obs. This beautiful species is longitudinally fulcated, having the edges of the base crenated: the lower part is an obscure red, and the upper part is transparent white marked with fine purple spots; the outer circumference of the aperture has a narrow stripe of pink. When expanded, the superior division

tion of the body seems formed of fleshy bars placed in a reticulated manner, and lined with a fine membrane. From perforated warts, placed without order on the outer coat, issued white filamentose substances variously twisted together : I have observed a similar body ejected from the mouths of all the species of this genus, which have fallen within my notice.

2. *senilis*. A. subcylindrica transversè rugosa. Linn. Syst. Nat. Ed. 13. p. 1088. Baster. subf. t. 13. f. 2. bona. Rocks, Tenbigh.

Obs. The specimens I observed were smaller than as represented in the figure above quoted ; but that remarkable soft hairy appearance arising from the slender form and number of the tentacula, which so readily distinguish it from its British congeners, is well portrayed. Colour white or pink ; when at rest, the exterior coat is smooth.

ASTERIAS.

1. *minuta*. A. corpore rotundo, radiis quinque tenuissimis hirsutis. Penn. Br. Zool. v. 4. p. 63. n. 61. Tenbigh, rare.

Obs. Body round, convex, brown, somewhat larger than the head of a common pin ; rays hirsute, about three times the diameter of the body, white. When examined under a microscope, the upper side appears marked with a tawny yellow spot in the form of a pentagon,

pentagon, and the under side with a small yellow cinquefoil. The body contains a yellowish juice. Rays jointed, and from either side of each joint proceed three oval pellucid pointed bodies, which cause its hirsute appearance.

2. *rubens*. A. stellata, radiis lanceolatis gibbis, undique aculeata. *Linn. Syst. Nat. Ed. 13. p. 1099. Baster. subf. t. 12. f. 1—6.*
Not unfrequent in Milford Haven.

Obs. Colour pale orange; diameter 14 inches.

3. *pectinata*? A. radiata, radiis duplicatis; superioribus pinnatis, inferioribus filiformibus. *Linn. Syst. Nat. p. 1101.*

A. decacnemos. *Pen. Br. Zool. v. 4. p. 66. t. 33. f. 71. bona.*

In Milford Haven, very common.

Obs. Both the pinnated and simple rays in this singular species are closely jointed throughout, and from these articulations arises its flexibility. The pinnæ on the under side are furnished with hollow tubes, gradually decreasing in size as they approach the end; from which proceed, at the will of the animal, small filiform, transparent, flexible bodies, which are probably the organs of feeling: On separating one of the pinnæ from the main stem, the flesh was found to be composed entirely of small opaque globes. The filiform rays (or perhaps more properly the *radicles*, since by them the animal attaches itself to any thing) are each terminated by an incurvated claw, resembling in figure and evidently for the same purpose as the claws of birds. The
body

body is covered on the upper side by five unequal valves. It is remarkable of this species, that it is furnished with *two* apertures, one at the confluence of the valves, the other in the largest valve; their position with respect to the centre is variable: the last may readily escape observation, except when the animal chooses to elevate it above the plane of the valve. When fully expanded, the inside appears clothed with a fine membrane longitudinally folded and revolute at its margin. Colour deep red.

Since the illustrious Mr. Pennant has not referred his *A. decacnemos* to the *A. pectinata* Linn. (though he has quoted Barrelier and the figure of Linckius, which are given by Linnæus as synonyms to his *A. pectinata*), I cannot but feel apprehensive of having committed an error in considering them as the same species, and have consequently affixed a mark of doubt to the Linnean reference; but since the specific character given in the *Systema Naturæ* accords perfectly with numberless specimens which I have examined, I trust it will not be the cause of any confusion to a British naturalist.

SERTULARIA.

1. *imbricata*. S. subramosa, vesiculis subclavatis, fursum inordinatè imbricatis.

TAB. II. fig. 5—11.

On the *Fucus nodosus*. Milford Haven.

Obs. This species seems most nearly allied to the *S. cedrina*.

drina. Linn. Syst. Nat. Ed. 13. p. 1313. n. 28. Pallas. Zooph. p. 139. from which however it differs in the vesicles not surrounding the stem in any regular series, and in their shape. Height, from one to three inches. Young shoots closely imbricated to their base, but older ones often naked: the smaller branches, which proceed from a main stem, have the vesicles placed bifariouly, but at their apex they resume the imbricated form.

TUBULARIA.

1. *flabelliformis*. T. tubulis parallelis fasciculatis; fasciculis radiatim dispositis.

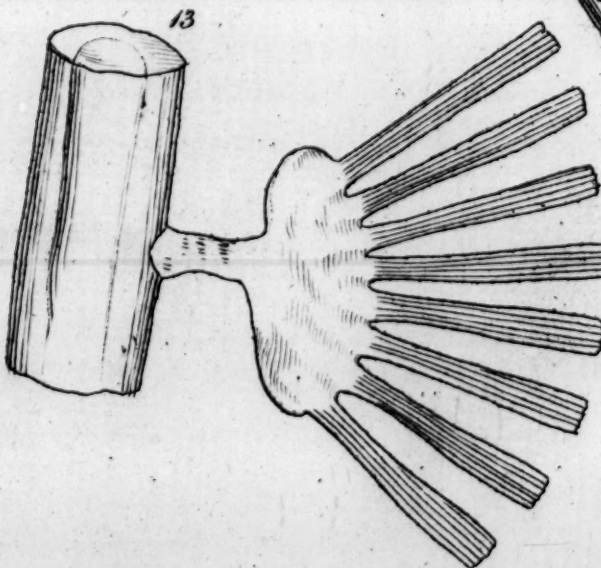
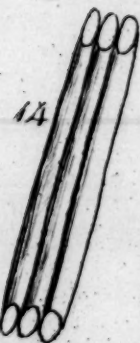
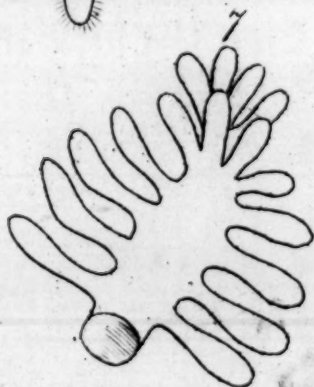
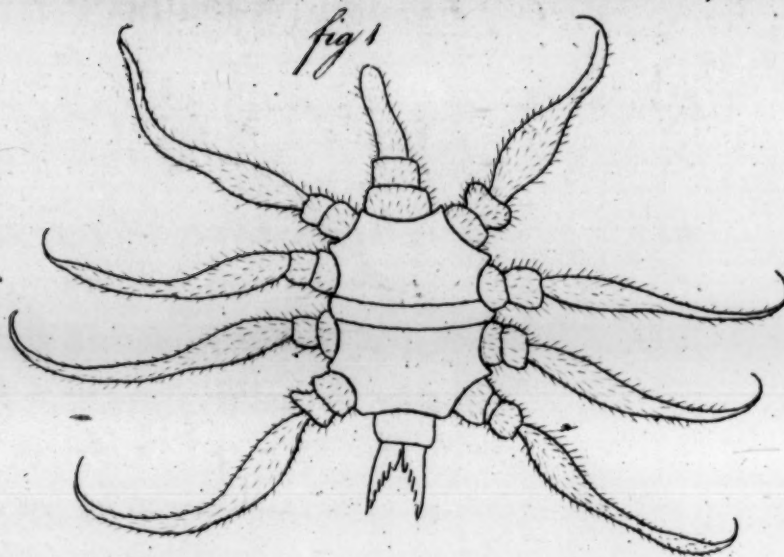
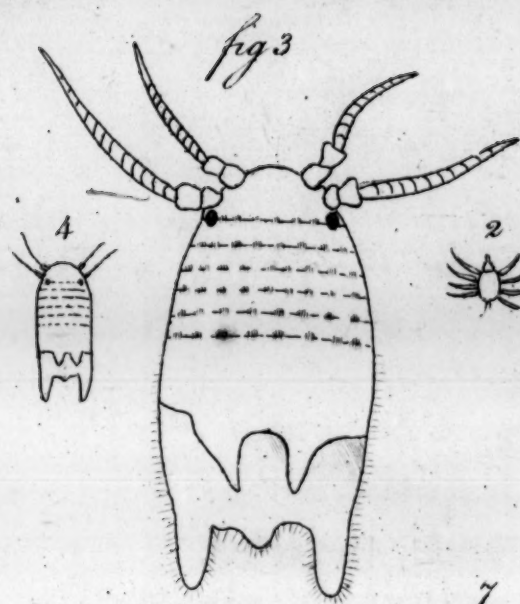
TAB. II. fig. 12, 13, 14.

On the *Conferva rubra*. Milford Haven.

Obs. This minute coralline differs considerably from its British congeners in habit, but agrees with them in texture. Its origin is a simple cylindrical stem, affixed at its base, which is a little dilated to the stems of the *Conferva*: it soon, however, loses this form, and very abruptly becomes dilated into a fan-shaped compressed body, from which proceed eight rays. These rays, when examined under the first magnifier of Ellis's microscope, appear composed of equal and perfectly cylindrical tubes. In some I observed a deep crimson spot, which was probably a dead or torpid polype.

EXPLA-





EXPLANATION OF TAB. II.

- Fig. 1. *Phalangium hirsutum*, magnified.
2. —————, natural size.
3. *Oniscus bidentatus*, magnified.
4. —————, natural size.
5. *Sertularia imbricata*, natural size.
6. —————, a branch, magnified.
7. —————, a young branch, magnified.
8. —————, a shoot from the base, magnified.
9. —————, the stalk without the vesicles, magnified.
10. —————, a young cell.
11. —————, a polype in its cell.
12. *Tubularia flabelliformis*, natural size.
13. —————, magnified.
14. —————, tubes which compose the rays, magnified.

III. *Observations on the Economical Use of the Ranunculus aquatilis : with Introductory Remarks on the acrimonious and poisonous Quality of some of the English Species of that Genus. By Richard Pulteney, M. D. F. R. S. and L. S.*

Read May 1, 1798.

BOOTH antient and modern writers on Botany, and the *Materia Medica*, agree, pretty uniformly, in attributing to many species of the genus *Ranunculus* a corrosive and poisonous quality. In several it abounds in such a degree as, when applied externally, in a recent state, to excite vesications, and ulceration of the parts, frequently of a malignant and gangrenous nature: and, when taken inwardly, to prove poisonous and fatal, by inducing vomiting, inflammation of the stomach, with the usual consequences of *acrid* poisons. These qualities are particularly manifest in the recent plant, while in its highest vigour before flowering; and more intensely in the germen of the flower itself, and in the petals of some.

The poisonous species, that are indigenous, and common in England, are, the *Ranunculus Flammula*, or Lesser Spearwort; *R. bulbosus*, bulbous rooted Crowfoot; *R. acris*, upright Crowfoot; *R. sceleratus*, Marsh Crowfoot; *R. arvensis*, Corn Crowfoot; and the *R. aquatilis*, or Water Crowfoot, according to the report of various authors. Of these the *Flammula*, *bulbosus*, and *sceleratus*, are judged to be the most acrimonious.

Before

Before the introduction of *Cantharides*, the acrid *Ranunculi* were, all in their turn, used as vesicatories; and Haller tells us *, the *R. Flammula* is still in use as such in some parts of France. Gilibert assures us†, that the *R. bulbosus* vesicates with less pain than the *Flies*, and has no effect on the urinary passages. He gives it therefore a decided preference as an epispastic. Other authors allow these qualities in the *Ranunculi*, and that they are quicker than *Cantharides* in their vesicating effect; but say, that all these advantages are more than balanced, by the greater uncertainty of their action on the skin, and their frequently leaving ill-conditioned ulcers, of which Murray and other writers have recorded instances ‡. Nevertheless, the *Ranunculi* were employed in local spasmodic complaints and in fixed pains, and not unfrequently in cataplasms to the wrists in intermitting fevers. *Crowfoot* is known also to have been one of the ingredients in Plunket's Epithem for Cancers.

The acrimony of these plants is, however, of so volatile a nature, that, even in the most virulent, it is wholly dissipated in drying; so that, in the form of hay, they appear to be harmless, and nutritive to cattle. It is also instantly expelled in decoction, probably in all the species; at least, Murray informs us, that the shepherds of Morlachia eat even the *R. sceleratus*, as a culinary plant, after boiling it: the *R. auricomus*, and, as several authors assure us, the *R. repens*, are so destitute of acrimony as to be wholly inoffensive, and even worthy of a place among oleraceous plants.

* See the *Enumeratio Stirpium* and *Historia Stirpium Helvetiae*, in which much satisfactory information is collected, respecting the properties of this genus of plants; and for which the Author has, with his usual candour and accuracy, quoted all his authorities.

† *Planta rariores Lithuaniae*, No. 331.

‡ *Apparat. Medicam.* iii. 87.

The *Ranunculi* give out this quality wholly in distillation: the water of the *R. sceleratus*, by the experiments of Tilebein, as recorded in the second volume of the *Chemical Annals*, is acrimonious in an intense degree, and, when cold, deposits crystals which are scarcely soluble in any menstruum, and are of an inflammable nature*. The distilled water of the *R. Flammula*, or Lesser Spearwort, as we are informed by Dr. Withering, is an emetic more instantaneous, and less offensive during its action, than white vitriol; and, as if Nature had furnished an antidote to poison from among poisons of its own tribe, is to be preferred in promoting the instant expulsion of deleterious substances from the stomach.

In the experiments of the *Pan Suecus*, even in the improved edition by Schreber, after the observations and renewed trials of Kalm, Gadd, Bergius, and Lastbohm, made upon horned cattle, goats, sheep, horses and swine, all the species of *Ranunculi*, with which trials were made, except the *R. auricomus*, were rejected by the horned cattle; and it is well known, that while our meadows and pastures are eaten bare of other vegetables, the *R. acris*, and *R. bulbosus*, which are but too plentiful, are left untouched: neither do cattle willingly eat the *R. repens*, although it is not wholly rejected by horses, sheep, and goats.

The *R. Flammula*, according to the above experiments, was eaten only by horses, to which animal it is there said to be very grateful; whereas the *R. auricomus*, eaten by all the rest, (except that swine choose only the roots,) was rejected by horses. The *R. sceleratus*, which is supposed to be the *Herba Sardonias* of Dioscorides, was touched by goats alone; the *R. bulbosus* only by the latter, though it is well known in England that hogs are fond of the roots. The *R. acris* was eaten by sheep and goats; but the *R. aquatilis* is recorded as the only one re-

* Page 313.

jected by all the five species of animals, on which these trials were made. It does not appear by either edition of the *Pan Suecus*, that any trials were made with *R. arvensis*; and though horned cattle and horses will eat this species greedily, (although not without subsequent injury,) yet it is known to have been highly deleterious to sheep. A notable instance of this occurred in Piedmont, in the year 1786, where a number of these animals died, as it was at first supposed, of an epidemical disease; but subsequent examination discovered, that this destruction was owing to the *Ranunculus arvensis*. The history of this accident is circumstantially related in the Memoirs of the Royal Academy of Turin, by M. Brugnon*. The herb grows luxuriantly in Piedmont, and the sheep fed with much eagerness upon it. The effects here mentioned were not immediate, but progressive; and M. Brugnon, on further investigation, was convinced they were principally owing to the roots of the plant; since by experiments purposely made on dogs, these animals were almost instantly killed by them. On the dissection of the sheep, all the four concoctive organs were found affected with erysipelatous and gangrenous spots; but more particularly the *abomasum*, which he found much more deeply ulcerated than the others; and the mischief had extended into the smaller intestines.

The avidity with which sheep, horses, and cows, eat the *Ranunculus arvensis*, is, as M. Brugnon justly observes, an exception to the commonly received maxim, that herbivorous animals are, by instinct, led to reject whatever is noxious. We see frequently, that hunger will impel our domesticated cattle, especially on being first turned to grass in the Spring, to eat almost all vegetables promiscuously:

* Memoires de L'Académie Royale des Sciences. Années 1788—1789, à Turin. 4to. 1790.

Some of our farmers are aware of the effects of *Crowfoot*, of which the *R. acris* and *R. bulbosus* are so common in our pastures, and by which the mouths of their cattle are frequently inflamed and blistered; and doubtless the effects often extend much farther, and sometimes prove fatal. There can be little doubt of the same destructive consequences from other poisonous plants, in cases where the cause is little suspected.

M. Krapf, who instituted a set of experiments wholly confined to this genus of plants*, attributes to the *R. aquatilis*, the deleterious qualities belonging to the others; observing, that it will vesicate the skin, but is slower in its operation than the *R. bulbosus* and *R. sceleratus*. Bishop Gunnerus also, in his *Flora Norvegica* †, tells us, that this species is not less noxious to cattle than the *R. sceleratus*; that even the goat, an animal less nice in the selection of its food than the others, leaves it wholly untouched.

It is well known to botanists, that the *Ranunculus aquatilis* of Linnæus comprehends four species of the older writers; and even Haller, and some more modern authors, still keep them separate: among whom, the late Professor Sibthorp, in his *Flora Oxoniensis*, enumerates them distinctly, under the names of 1. *R. heterophyllus*, or *R. aquatilis* Ger. em. 829. Ray Syn. 249. 2. *R. aquatilis*, or *R. aquatilis omnino tenuifolius* J. B. iii. 781. Ray Syn. 249. 3. *R. circinatus*, *R. aquaticus albus*, *circinatis tenuissime divisis foliis*, floribus ex alis longis pediculis innixis Pluk. alm. 311. 1. 55. 2. Ray Syn. 249. and 4. *R. fluviatilis*, or *Ranunculo sive Polyanthemo aquatili albo affine*, *Millefolium maratriphyllum fluitans*. J. B. iii. 782. Without en-

* C. Krapf, Experimenta de nonnullorum Ranunculorum venenata qualitate, horum externo et interno usu. Vienna, 1766. 8vo. p. 107.

† No. 646.

tering here into any disquisition relative to these distinctions of the species, I shall come to the ultimate object of these observations, by remarking, that I was lately witness to a fact, with respect to the *Ranunculus aquatilis fluvialis*, which, after what I recollected of the character of the plant, somewhat surprized me, while it sufficiently proved, not merely the innoxious quality of this plant, but that it is nutritive to cattle, and capable of being converted to useful purposes in agricultural economy. Unless these varieties of the *R. aquatilis* Linn. be endowed with different properties, it is a proof that the experiments on this plant were not made with sufficient accuracy, or discrimination of the varieties; not sufficiently repeated on different individuals of the same species of animals; or, that in different countries or situations it is divested of its virulence. In the present instance, it is probable, the plant is rendered inert as a poison, by growing in the water; although in certain other instances, moisture is thought to heighten the deleterious property of vegetables, especially in the umbelliferous tribe.

The fact that I have alluded to is, that in the neighbourhood of Ringwood, on the borders of the Avon, which affords this vegetable in great abundance all the year, some of the cottagers sustain their cows, and even horses, almost wholly by this plant; since the remaining part of their food is nothing more than a scanty pittance they get on the adjacent heath, which affords little more than *Ling*, *Lichen*, Bog-moss or *Sphagnum*, &c. It is usual to employ a man to collect a quantity for the day every morning, and bring it in the boat to the edge of the water, from which the cows, in the instance I saw, stood eating it with great avidity. I was indeed informed they relished it so highly, that it was unsafe to allow them more than a certain quantity; I think between twenty-five and thirty pounds each, daily; but with variation according to circumstances.

The cows I saw were apparently not in a mean condition, and gave a sufficient quantity of good milk. I was told by the person whose cattle were feeding on it, that he kept five cows and one horse so entirely by this plant, and what the heath afforded, that they had not consumed more than half a ton of hay throughout the whole year; none being used, except when the river is frozen over. I examined the whole parcel, on which four cows were feeding, in the beginning of March; and found the whole consisted, exclusively, of the *Ranunculus fluvialis*, without any mixture of the *Potamogeton*, *Carex*, *Sparganium*, or other aquatic plants. In Summer, however, it can scarcely be avoided but that there must be a mixture of some of these: but other plants are not chosen.

This account was confirmed to me by different persons; by whom I was further informed, that hogs are also fed with the same plant, on which they improve so well, that it is not necessary to allow them other sustenance, till it is proper to put them up to fatten.

This relation, while it shews how carefully experiments should be conducted before a decisive judgment on the powers of any reputedly poisonous vegetable can be formed, may induce such as were unacquainted with this fact, to adopt the use of this plant in similar situations, since it is one of the most frequent in many rivers of this kingdom. The application of it to these useful purposes will also answer a secondary good, of tending to clear the streams of what is otherwise considered as a noxious weed; since, by its abundance in Summer, it is frequently seen to choke up the rivers more than any other plant, and, from slight falls of rain, contributes much to the overflowing of meadows in hay-time.

IV. *Observations on preserving Specimens of Plants.**By John Stackhouse, Esq. F. L. S.**Read October 2, 1798.*

IN prosecuting my researches with a view to complete the history of the British *Fuci*, I was desirous to discover, if possible, a method of preventing the olive-coloured, coriaceous species from turning black in drying. For this purpose I tried the experiment of immersing them in a strong solution of alum. The result of my experiment did not answer my expectation. They were prevented indeed from turning black, but they acquired a greenish hue. However, imagining this might arise from the mixture of aluminous with muriatic salts, and being of opinion that the properties of alum might be of great use in preserving land plants on several accounts, I set on foot a course of experiments, and am happy to say that the result has been favourable to my expectations. After repeated trials, during which partial failures occurred, owing to the proportioning the degrees of strength of the solution, and the admission of light and air during the time of drying, I can safely recommend to the public attention the process which follows, not doubting but that many improvements will suggest themselves to those who possess a chemical knowledge of the various substances made use of by dyers in fixing their colours.

Take a saturated solution of powdered alum in common water : immerse carefully your specimen, flowers, leaves and stalk, in this liquor.

liquor. During this immersion, with a camel's-hair brush, such as varnishers make use of, wet thoroughly a sheet of blotting-paper : display your specimen carefully on this paper, and prepare another sheet in a similar manner to lay over your plant. Then give a smart pressure to your plant, either with a botanical press, a napkin press, or weights of any kind applied to the specimen placed between smooth boards, or books, observing to lay about half a quire of paper below the specimen, and the same quantity above, to take up the moisture. After a day or two, according to the succulency of the plant, and when the aluminated paper appears perfectly dry, your specimen may be removed into fresh paper, and kept carefully under gentle pressure, with the edges of the paper folded over each other to prevent every possible admission of light and air, till its removal into the herbarium. For those who wish to affix their specimens (and it is scarcely possible to effect the preservation of the delicate tints of the petals of many kinds without a strong adhesion to, and almost incorporation with the paper), the time abovementioned, that is, when the aluminated paper is thoroughly dry, is the proper time for proceeding with the operation. Have ready a paste made with flour and water, with alum mixed in it, such as upholsterers use, strong gum-water, or isinglass-glue: apply either of these to the back of your specimen with a brush; then fix it carefully on strong writing or drawing paper, by laying your paper smoothly on the specimen as it lies, pressing it gently with your hands and a cloth, and then turning over both together. When this is done, iron the plant with a box-heater in the manner recommended by Major Velley in Dr. Withering's *Arrangement of British Plants*, v. 1. p. 34. if you have the conveniencies; if not, apply an immediate and smart pressure, as before directed.

It is taken for granted that those who wish to profit by these instructions,

instructions, are practised in the usual methods of preserving dry specimens, and that they are aware that particular care should be taken to pare off the back parts of thick woody stalks, and of the globose, succulent heads of flowers, as well as of the buds of those intended to be pasted down, previous to their pressure. For the most satisfactory information on these particulars, the reader is referred to the Introduction to Dr. Withering's excellent work above-mentioned. It is almost needless to mention, that aluminated specimens will be completely guarded from the erosion of insects, as well as from the danger of being injured by damp; and therefore the process will be particularly valuable to those who visit foreign countries.

As beauty and durability are of so much consequence in the arrangement of an herbarium, and as plants cannot be preserved any length of time in perfection even with the usual apparatus of a *vaseculum*, or tin-case, no botanical traveller should be without a small press, such as that described in Dr. Withering's *Arrangement*, v. I. p. 31. It may be framed so as to admit of a drawer for receiving the preserved specimens; either thin enough to lie under the feet in a post-chaise; or, as a seat for a third person is often desirable, it may be contrived to be as high as the seat of the carriage, with a corresponding cushion on the top.

V. *On the Ascarides discovered in the Pelecanus Carbo and P. cristatus.*
By Richard Pulteney, M.D. F.R.S. and L.S.

Read November 6, 1798.

THE liberty I now take of troubling the Society, with what may appear to many a trifling object, is, however, one among many other proofs of the utility of its institution; as affording a repository, or centre of communication, always open for the reception of detached tracts in Natural History; which, if deemed of small importance in such instances as the present, is more than balanced by the utility of others that might be entirely buried in oblivion, for want of a ready and convenient mode of introduction to the public, without the obligation of writing a formal dissertation which perhaps neither time, nor want of proper aid by access to books, may allow.—In that situation I now wish to be regarded, and indulged, by this Society.

Having lately heard a gentleman, remarkable for his skill as a sportsman, and not less curious in his observations, relate that he had more than once, on opening the crop of the Corvorant (*Pelecanus Carbo*, Linn.), found a large quantity of worms in it, I engaged him to send me a few. He informed me, that they lay coiled together into a ball or congeries (as I believe is usually the case) of a large size, in some equal to that of an egg. It was not, however, from the *Corvorant* only, but from the *Shag* also, that these worms were taken. They were promiscuously put into a phial, and do not

appear to differ. In the recent state they were of a brownish-yellow cast, having lost much of the colour since they were put into the brandy and water. This gentleman, and the party with him, killed at the time upwards of twenty of these birds, in every one of which worms of this kind were found; and, what appears worthy of attention, is, that they were discovered, together with small pebbles, and fragments of wood, in the crops of *young Shags*, that had never been out of the nest.

A few of these animals will be presented to the Society with this paper, and I think it will appear that they are all of the kind called *Ascarides*, the species of which, or at least the different species of animals in which the same is found, have been discovered, of late years, to be greatly more numerous than was formerly known; observations relating to worms in the intestines of animals having been almost wholly confined to those found in the human species.

Linnaeus describes only two *Ascarides*, for the characters of which I need only refer to the *Systema Naturæ*. It is to the discoveries of later authors that we owe the knowledge of a much greater number; and find them now inhabiting a great variety of subjects throughout the different classes of the animal kingdom. It is well known that Redi was the first writer who augmented the knowledge left us by the Antients, or who extended enquiries on the subject of *Animalcula* which infest the bodies of living animals. He mentions the *Ascarides* of the Eagle, the Raven, the Swan, the Crane, and of several others*. After his time, scattered observations only were recorded, and many years intervened before any considerable advances were made in this branch of science, howsoever closely connected with the well-being of mankind.

* *Fr. Redi, de Animalculis vivis, quæ in Corporibus Animalium vivorum reperiuntur, Observationes. Amstelod. 17c8. 12mo.*

Among the more modern publications, that of M. Pallas unquestionably holds a distinguished rank. His *Thesis de infestis viventibus intra viventia*, printed at Leyden in 1760, is an elaborate disquisition on this subject, and is worthy of being particularly noticed, as containing not only very complete descriptions and specific differences of worms infesting the body of man, but also a collected series of the most useful knowledge of preceding writers, with the various modes of extirpating these pernicious inmates.

To the almost unparalleled industry of Otto Frederic Müller the greatest merit is due, for his accurate description of the *Helminthic* order: and, probably, we owe to the Royal Society of Copenhagen, two publications which have since so much extended the knowledge of the present day, on the subject of my paper. The *Premium*, of which I give the title below *, held forth by this Society, excited the diligence of M. Bloch of Berlin, and M. Goeze, to both of whom prizes were assigned. M. Bloch published his Dissertation, which was translated into French, under the title below recited †; the latter published a Description of the same animals, in quarto, p. 471. in the German language, with 44 plates. Gmelin, in his enlarged edition of the *Systema Naturæ*, has enumerated seventy-eight species of *Ascarides*, having arranged them according to the classes of animals in which they exist; of which, twenty-four species of birds are found to be infested with these worms. Those I now send are an addition to that number. M. Goeze alone, from references to his work in Gmelin, appears to have described upwards of twenty

* An, Seminium vermium intestinalium, Teniæ, Gordii, Ascaridis, Fasciolæ, &c. animalibus connatum; an, ab extus intromissum; observationibus, et argumentis probare remediaque in illo casu recensere.

† Traité de la Generation des Vers des Intestines et des Vermifuges. *Straßburgh*, 1788. 8vo. p. 127. tab. x. first printed in German at Berlin in 1782.

Ascarides before unnoticed; exclusive of nine or ten kinds of the newly-named genus *Echinorynchus*, so nearly allied to the *ascaris*, as to be heretofore classed under the same name.

From this general view of this subject, there is little room to doubt, that *Ascarides* exist in a variety of other animals as yet unexamined: and although Gmelin does not refer any to the class of insects, I am assured by my friend Aylmer B. Lambert, Esq. that he saw a living worm crushed out of the body of the *Carabus hortensis*.

VI. *Observations on the Orcheston long Grass.* By William George Maton,
M. B. F. L. S.

Read December 4, 1798.

IT must have been a matter of much surprize to many besides myself, reflecting how long the Orcheston grass has been known, and how frequent the opportunities have been for a full and accurate examination of it by botanists and agriculturists, that its history was so very contradictory and incomplete. It was not until I visited the meadow, and paid considerable attention to its produce, that I discovered the cause of this. The fact is, that the grass was examined by the different persons who have written upon the subject of it at very different seasons of the year, and each taking it for granted that it was a peculiar species, or at any rate a peculiar variety of some one species, made his report on that one only which chanced to be in its perfection at the period of his inspection. Hence one gentleman, who visited the spot about the latter end of July, pronounces the Orcheston grass to be exclusively *Agrostis stolonifera**. Another, happening to obtain his specimens earlier in the year, says, that *Poa trivialis* is the species†. Another observer, bearing stedfastly in mind that it has been described as a peculiar grass, increases the uncertainty, by declaring that, "by all the enquiries he has made, he has not found that this species of grass

* See *Memoirs of the Bath Society*, vol. i. p. 93.

† *Withering's Bot. Arr. of British Plants*, vol. ii. p. 144.

grows

grows in any other part of the kingdom*." This last opinion indeed has been most general, and it evidently originated from the account given of it in the *Indiculus Plantarum dub.* into which it was copied from Merret's *Pinax*, or at least from How's *Phytologia Britannica*, (printed in 1650,) where is the earliest mention of this phenomenon in vegetation that I can find, and it is described as "*Gramen carinum, supinum, longissimum, non descriptum.*" Merret, however, remarked, in addition, that it was found in some parts of Wales. I apprehend that Ray never saw it. But I am at length satisfied that the long grass of Orcheston is not only not a species peculiar to the spot, but that it is composed of most of the species which grow in other meadows.

The meadow producing the grass which has excited so much curiosity is situated in the lowest part of a very narrow winding valley †, sheltered on each side by gradual but by no means lofty acclivities of chalk. This valley forms a channel for the frequent floods which come down from Tilshead (about three miles distant) in the Winter season; and, from the meadow alluded to being the lowest of the range, in regard to level, the water rests there to some depth, if it does any where, and indeed the place is rarely otherwise than swampy throughout the year. There is one spring not half a mile distant, and therefore the water by which the meadow is often submerged, may at first be of a higher temperature than the surrounding atmosphere. The earlier the springs swell, the more plentiful is the succeeding crop of grass. This circumstance has constantly

* *Memoirs of the Bath Society*, vol. i. p. 95.

† Dr. Withering is incorrect in calling the distance of Orcheston St. Mary from Salisbury 19 miles; it is certainly not more than 11. The meadow is about half a mile from the village of Shrewton. It is at present rented by Farmer Sheats, of Orcheston St. George.
been.

been remarked by the neighbouring inhabitants. A bed of small loose pebbles, which are all of a siliceous nature, with a scanty covering of mould formed from the decomposed relics of former vegetable generations, constitutes the immediate soil.

My last visit to Orcheston St. Mary was on the 15th of August last. I at that time found the following grasses growing in the meadow, viz. *Holcus lanatus*, *Lolium perenne*, and *Agrostis stolonifera*. All these were pretty nearly of the same length, measuring about seven feet. They usually rise, I understand, about 16 or 17 inches before they fall and run along the ground in knots, which knots send forth shoots into the interstices of the pebbles. Most meadow grasses so circumstanced with respect to soil would probably become knotted. In June, *Triticum repens*, *Avena elatior*, *Alopecurus pratensis*, and *Poa trivialis* (*palustris*, of Hudson), are seen thriving similarly to those species above mentioned. I have specimens of the last, which measure nearly ten feet in length. Some of the spikes of *Triticum repens* have between forty and fifty *glumæ*. Even *Conium maculatum*, growing in the surrounding hedges, reaches the height of seven or eight feet. Besides grasses, I have found in this remarkable meadow *Symphytum officinale*, *Convolvulus arvensis*, *Potentilla reptans*, *Ranunculus pratensis*, and *Oenanthe crocata*, all unusually strong and succulent, and strikingly tall.

The crops of the Orcheston grass within late years have not by any means equalled what they have heretofore been. Perhaps the gradual deepening of the mould may be the cause of this, as it must deprive the crop more and more of the advantage arising from the disposition of the pebbles, which (if I might venture a conjecture) seems to be a very important peculiarity in the situation. It is certain that the space of only two acres and an half *has* yielded as much as ten tons of hay in one year. The first crop has usually been cut
about

about the end of May, and the second in July, or (which is rare) as late as the end of August. The tithes of the meadow have been rented more than once for 5 $\frac{1}{2}$ l. the produce amounting to 25 hundred weight of hay.

The herbage of the adjoining meadows, I have remarked, is very exuberant; and this exuberance may be traced increasing or declining according as the soil varies more or less from that of the principal meadow.

At the distance of a mile or two miles from Orcheston, but in the same valley, some of the grasses may be seen to put on an uncommon luxuriance; and I have no doubt that, in proportion as meadows in other parts of the kingdom approach more nearly in circumstances and situation to that of Orcheston, the more similar their produce will be found.

VII. *Description of a new Species of Mycteria.* By George Shaw, M. D.
F. R. S. V. P. L. S.

Read December 4, 1798.

THE following is a description of a species of *Mycteria* or *Jabiru*, the skin of which was transmitted to me for examination by the Rev. Mr. Rackett, F. L. S. who received it from Mr. Bryer, of Weymouth.

It is said to be a native of Senegal. The length, from the tip of the bill to the ends of the claws, was six feet, two inches. The bill was thirteen inches in length, which is also the measure of that of the common Jabiru. The neck was fifteen inches. The body twelve inches. The naked part of the thigh eleven inches; the feathered or fleshy part four inches. The knee-joint one inch. The leg thirteen inches and a half. The foot, to the tip of the middle toe five inches and a half. The two outside toes are about an inch shorter than the middle one. The back toe scarcely quite two inches. A very slight approach towards a semipalmated appearance takes place at the first joint: the claws are small and blunt. The bill is pale or whitish at the base for near three inches from the setting on of the upper mandible, and one inch and a half from the lower: then succeeds a broad black zone across both mandibles, about three inches wide; well defined on the back part, but somewhat irregular in front. From this part the bill is pale, with a slight cast of reddish for about two inches, and from thence grows intensely red or of a vermilion colour to the tip. On each side the

upper mandible is a large semi-oval and semitransparent space, which, at its back part, is continued upwards in a curved direction across the fore part of the eye. A little way down the upper part of the bill runs a bare flattened part, somewhat in the manner of the cere in the *Fulicæ* and other birds of that tribe. The whole head and neck are black, and covered with feathers, which, on the head, seem to have been small and semi-setose on the front, but somewhat longer and larger on the occiput. Those on the neck are ovate-lanceolate and of the usual structure, or as in the generality of birds. The plumage of the breast, back, thighs, &c. are also of the usual structure, but much more inclining to a rounded than lanceolate form. The wings were wanting: the shoulders alone remaining, for about the length of four inches; they were covered with white feathers. The scapulars, which were left on each side, were black, with whitish bases: they were about fifteen inches in length. The whole remainder of the bird was white. The tail was entirely wanting. Beneath the base of the bill, on the skinny or gular part, were situated two very small pear-shaped, pendant wattles, adhering by very small necks: they were seated at about three quarters of an inch from each other, and in the dried specimen were of a substance resembling isinglass. The legs are extremely long, and the thighs, to a distance nearly equal to that of the leg itself, are quite bare. The whole leg and thigh of a black colour, except that round the knee, as well as round each joint of the toes, is a pale band or zone. The whole length of the leg and thigh is coated with hexagonally-longitudinal scales or divisions.

If this bird be collated with the descriptions of the *Myiæria Americana* or Common Jabiru, it will clearly appear to be a distinct species. It approaches much more nearly to the *Myiæria Australis* or New Holland Jabiru, but, in that bird, there is not the slightest

appearance of the membranaceous or semitransparent part on each side of the upper mandible. The colours also both of the bill and legs are widely different from those of the New Holland Jabiru; but it agrees with that species in having the head and neck covered with feathers. Of the New Holland species a beautiful specimen may be seen in the Leverian Museum, which, however, seems not to have quite attained to its full size, since it falls short of the measurements marked in some drawings executed in New Holland from the recent bird.

In order to elucidate as much as possible this curious genus, I shall conclude with giving the specific characters of all the three birds above mentioned. It is to be observed, that in the *Systema Naturæ* no specific character is given of the *Mycteria Americana* or Common Jabiru; that being then the only species known to exist. It is now necessary to form one for that species; viz.

I. MYCTERIA *Americana*.

M. alba, capite colloque nudis nigris, zona colli inferioris rubra, occipite albido, rostro pedibusque nigris.

American Jabiru.

White Jabiru, with the head and neck naked and black; a red zone round the lower part of the neck; the occiput whitish; the bill and legs black.

2. MYCTERIA *Australis*.

M. alba, capite colloque viridi-nigris; tectricibus, pennis scapularibus caudaque nigris; rostro nigro, pedibus rubris.

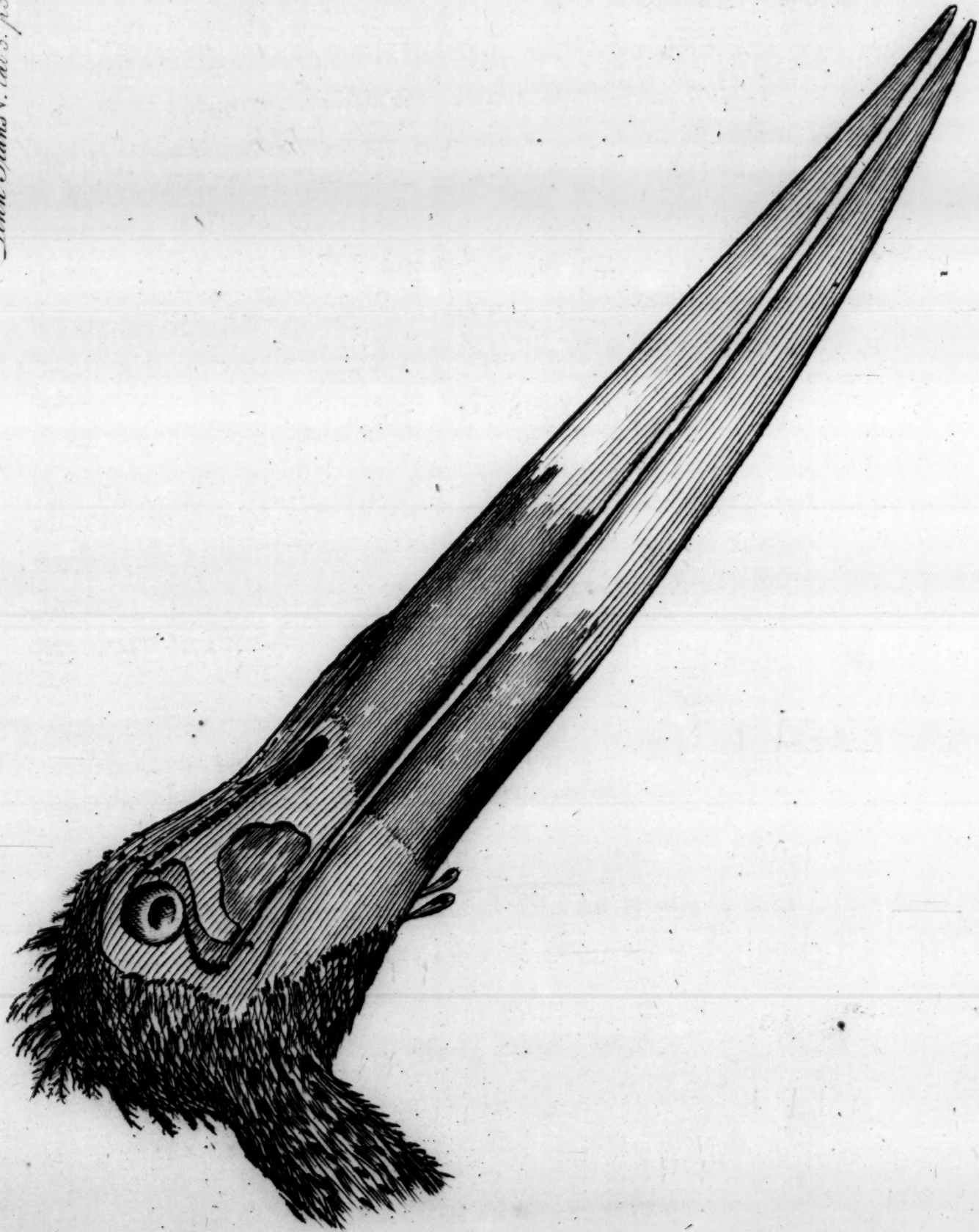
New Holland Jabiru.

White Jabiru, with the head and neck green-black; the coverts, scapulars, and tail black; the bill black, the legs red.

3. MYCTERIA



Linn. Trans. V. tab. 3. p. 35.



3. MYCTERIA *Senegalensis*.

M. alba, rostro apicem versus rubro, basini versus albido fascia nigra, macula utrinque fenestrata.

Senegal Jabiru.

White Jabiru, with the bill red towards the tip, whitish towards the base, with a black transverse band, and a transparent spot on each side.

I have added a representation of the head of this species, half its natural size. TAB. III.

VIII. *A Supplement to the Plantæ Eboracenses printed in the Second Volume of these Transactions.* By Robert Teesdale, Esq. F. L. S.

Read December 4, 1798.

THE Linnean Society having honoured with a place in the Second Volume of their Transactions, p. 103, a paper entitled, *Plantæ Eboracenses*, I now beg leave to lay before them, as an addition to that paper, the following catalogue of Yorkshire plants: the former list was confined to a small part of the county, this is extended to the whole, that is, so far as my own observations, and the communications of my botanical friends, have enabled me; to which is added, such of the more rare plants as have not fallen under our observation, but are mentioned, as natives of the county, by Ray, Dillenius, Hudson, Smith, Dickson, and Withering.

Plants that are found in every part of our island are generally omitted, as they were in my former paper, excepting those of the Cryptogamia class.

It would be presumption in me to suppose that this list, and my former one, contain any thing like a complete Flora of so extensive a county; however I flatter myself the Society will do me the honour to accept of my efforts towards it, and wish they may be the means of exciting others of superior talents, to finish what I have only made a beginning of.

My two catalogues, including the common plants omitted, contain

tain about nine hundred and ten species*, exclusive of the Cryptogamia; and of these enumerated, though several extensive genera are left out, there are about four hundred and fifty.

I have travelled over, and scrutinized, at different times, the greater part of the county; and the part which is celebrated for the more rare plants, that is, Ingleborough Hill, and its neighbourhood, has been visited by almost all the curious botanists of the last and present age; notwithstanding, many plants may yet remain undiscovered, as it is well known by every practical botanist, that the more rare ones are extremely local, and of course are frequently overlooked by the most accurate observers. In fact, the botanizing of mountains is a laborious business; and they can only be minutely examined by persons who are nearly resident, as their visits should be frequent, and at all seasons of the year.

The learned Dr. Goodenough having, in his excellent paper on the British species of *Carex*, changed some of their trivial names, and added some new species, it was presumed it would be the most eligible to insert in this paper, with the Doctor's names, the whole of those which we have met with in the county, although the greater part of them are contained in my other paper: the same kind of repetition is likewise made in the *Polytricha*, having now adopted the names of the ingenious Mr. Menzies in that genus.

Turnham Green, Dec. 3d, 1798.

————— O Jehova,
Quam ampla sunt tua opera!
Quam sapienter ea fecisti!
Quam plena est terra possessione tua!

DAVID, *Psalms* 104. v. 24.

* Sibthorp's *Flora Oxoniensis* contains 734 plants; and Relhan's *Flora Cantabrigiensis* contains 795, exclusive of the Cryptogamia.

TRIANDRIA MONOGYNIA.

Crocus fativus - - - *Huds.* 13. *With.* 68.

About Halifax. Rev. Mr. Wood. in *With.*

Valeriana rubra - - - *Huds.* 12. *With.* 65.

Old walls, in various towns; probably as much a native of Yorkshire as any other county.

Schoenus fuscus? - - β . *albus.* *Huds.* 16. *With.* 80.

Bogs near Turlington, growing among the *S. albus*; rare.

Scirpus pauciflorus - *With.* 74.

Houghton-moor, near Newbold, in the East-riding. Marshes, near Beverley. It is not an uncommon plant.

maritimus - *Huds.* 21. *With.* 77.

Ditches, and in the Lake at Hornsea. Near Hull abundantly.

Eriophorum polystachion *With.* 72. *Leers t. 1. f. 5.*

Bogs. Wet meadows and pastures, in many parts of the county. Near Beverley.

Mr. Dickson was the first of our British authors who pointed out the distinctions between this and the *E. angustifolium*, in *Trans. Linn. Soc.* vol. 2. p. 289.

Obs. I have frequently found plants of this genus, some hermaphrodite, and others dioicous; and in a more forward state of their growth, I have observed some with
long,

long, and others with short down. It is probable there may be another species.

DIGYNIA.

- Alopecurus bulbosus* - β . *geniculatus*. *Huds.* 27. *With.* 120.
Places where water stands in the Winter.
Near Hull.
- Agrostis pumila* - - *Lightf. Frontispiece*, vol. 2.
Heaths near Harrowgate.
- maritima* - *With.* 132.
Sea-side. Bridlington Quay.
- Aira montana* - - β . *fetacea*. *Huds.* 35.
Houghton-moor.
- cæspitosa* - - Var. 2. *vivipera*. *With.* 136.
Mountains in the West-riding.
This always continues the same under cultivation.
- Festuca loliacea* - - *With.* 157.
Meadows. Near Beverley.
- rubra* - - *Huds.* 45. *With.* 153. *Leers t.* 8. f. 1.
Heaths. Dry Pastures. Flamborough Head.
- myurus* - - *Huds.* 46. *With.* 151. *Leers t.* 3. f. 5.
On walls. Beverley.
- Bromoides* - *Huds.* 46. *With.* 151.
Turf walls. Dry Banks. On the Wolds.
- dumetorum* - *With.* 154.
Meadows. Sides of hedges. Rare.

Poa

- Poa maritima* - - *Huds.* 42. *With.* 147.
Hornsea. Banks of the Humber at Hull.
- distans* - - - *With.* 141. *t.* 25.
Yorkshire. *Withering.*
- glauca* - - - β . *pratensis.* *Huds.* *With.* 148.
Ingleborough Hill, and other mountains.
- vivipara* - - - γ . *pratensis.* *Huds.*
Ingleborough and other hills.
- nemoralis* - - *With.* 146. β . *angustifolia.* *Huds.*
On walls, adjoining to woods, at Castle-Howard.
- cristata* - - *With.* 145. *Aira cristata.* *Linn.* *Huds.* 33.
Sandy heaths, and pastures.
- Melica montana* - - *Huds.* 37. *M. nutans.* *With.* 138.
Woods, about Settle and Ingleton.
- Arundo arenaria* - *Huds.* 54. *Calamagrostis arenaria.* *With.* 123.
Hornsea. Bridlington Quay.
- Elymus arenarius* - *Huds.* 56. *With.* 170.
In the Sands at Hornsea, and Bridlington Quay.
- Obs.* We have two varieties of this; one very glaucous, which is not so tall nor large as the other which is less glaucous.
- Sesleria coerulea* - - *With.* 140. *Cynosurus coeruleus.* *Huds.* 59.
Limestone rocks. Ingleborough. Settle. Ingleton.
- Triticum junceum* - *Huds.* 58. *With.* 173.
Sea-side, Hornsea.
 β *junceum.* *Huds.* With the above.

Triticum loliaceum - *Eng. Bot.* 221. *Triticum maritimum*. *With.*
Poa loliacea. *Huds.* 43.
 Sea-shore. Not common.

Lolium arvense - - *With.* 168.
 Walkington fields. Near Beverley.

Bromus fecalinus - *Smith in Transf. Linn. Soc.* vol. 4. p. 281.
 Corn-fields at Bulmer. Market Weighton. Near York.

racemosus - Meadows at Beverley.

I have a variety much smaller in the whole habit; the upper part of the straw and panicle are purple. It grows in wet marshes near Beverley, and is the only species of the genus I ever observed in that kind of situation. I shewed my specimens of this plant to the learned Dr. Smith, who informed me, they were the true *B. racemosus* of Linnæus.

arvensis - - Corn-fields at Little Weighton, amongst wheat, where it was six feet high. ☉ VII.
Obs. This is rare. What I have named *B. arvensis* in my former paper, were some large plants of the *B. racemosus*.

erectus - - Wolds. Very common; some meadows near Newbold, almost wholly of it.

Obs. The yellow, or orange-coloured Anthera, distinguishes this from all its congeners.

TETRANDRIA MONOGYNIA.

- Dipfacus pilosus* - - *Huds.* 61. *With.* 182.
Woods near Beverley. Colonel Machell.
Various places in the North-riding.
- Centunculus minimus* - *Huds.* 63. *With.* 198.
Houghton-moor, the side next to Newbold. I have not heard of this being found in any other part of the county.
- Plantago maritima* - γ . *Huds.* 64.
Mountains near Settle.
- Galium erectum* - - *Huds.* 68. *With.* 189.
Moist meadows and pastures near Helmsley. Rare.
- pufillum* - - Near Leckonfield. Rare.
- montanum* - *With.* 187. *t.* 28.
Walkington Wood, near Beverley.
- anglicum* - *Huds.* 69. *With.* 191.
Near Boynton, the Seat of Sir George Strickland, Bart. Mr. Knowlton, F.L.S.
- Alchemilla alpina* - *Huds.* 71. *With.* 205.
Mountains in Yorkshire. *R. Syn.*

TETRAGYNIA.

- Sagina apetala* - - *With.* 216. β . *procumbens.* *Huds.* 73.
Corn-fields. On walls.
- Potamogeton marinum* *Huds.* 76.
Ditches at the garrison at Hull.
- marinum* *Vaill.* *t.* 32. *f.* 3.
Ditches near the sea at Hornsea. *Obs.*

Obs. I take this to be very different from the common *P. marinum*. Vaillant's figure is a good representation.

Potamogeton palustre - foliis inferioribus submersis lanceolatis membranaceis sessilibus, superioribus ovalilanceolatis petiolatis coriaceis natantibus.

Ditches near Beverley.

Obs. This has generally been taken for a var. of the *P. natans*.

PENTANDRIA MONOGYNIA.

Anchusa sempervirens - *Huds.* 80. *With.* 227.

By the road between Settle and Ingleton.

Primula elatior - - *With.* 234. β . vulgaris. *Huds.* 84.

Under hedges—Sides of woods, not very common.

Convolvulus Soldanella *Huds.* 89. *With.* 240.

Owthorn, on the Holdernefs coast, where it has been found by Henry Grimston, Esq. F. L. S.

Lyfimachia thyrsiflora - *Huds.* 86. *With.* 237.

In the East-riding. *Ray's Syn.*

I could not find it, but it may possibly be there, as there are large tracts of marsh lands, the kind of situation it is said to prefer.

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Polemonium cœruleum Hudf. 89. *With.* 241. *Eng. Bot.* 14.
Near Settle. Ingleton. Malham Cove.

Ribes alpinum - - Hudf. 99. *With.* 264.
On the walls of Fountains Abbey.

Ribes spicatum - - *With.* 265. *Linn. Transf.* vol. 3. p. 240. t. 21.
Near Richmond. Mr. Robson, in *Transf.*
of the Linnean Society.

rubrum - - Hudf. 99.
In the Northern parts of the county.
Wenfleydale.

Glaux maritima - Hudf. 101. *With.* 268.
Sea shores. Banks of the Humber.

Vinca minor - - Hudf. 91. *With.* 268.
Near Kirkham Abbey, and Westow.
Mr. Grimston.

Campanula hederacea Hudf. 97. *With.* 244.
Near Halifax. Mr. Bolton, in *Hudf.*

Anagallis cœrulea - *Hoffm. Germ. Fl.* 70. *δ. arvensis.* Hudf. 87.
Malton corn-fields.

Obs. Mr. Knowlton informs me, that this
plant has sown itself many years in the
garden at Londesbrough, and that it
never varies: I therefore presume it may
be a distinct species, though I do not
perceive the difference in the calyx,
mentioned by Hoffman.

Verbascum nigrum - Hudf. 90. *With.* 250.
North, and West-ridings, in many places.

Rhamnus Frangula - Hudf. 98. *With.* 259.

Houghton-

Houghton-moor. This is rather a rare plant in the North of England, but is very common in all the hedges in some parts of Wiltshire.

DIGYNIA.

Chenopodium maritimum Hudf. 107. With. 273.

Flamborough Head. Col. Machell.

Beta maritima - - Hudf. 108. With. 277.

Bridlington Quay.

Eryngium maritimum Hudf. 109. With. 283.

Hornsea, sparingly. Hollym in Holdernefs.

campestre - Hudf. 110. With. 285.

Below Melling, plentifully. Hudf.

Bupleurum tenuissimum Hudf. 111. With. 285.

Near Stockton, Yorkshire. Mr. Robson.

Selinum palustre - - Hudf. 115. With. 293.

Marthes, near Beverley, abundantly.

Caucalis daucoides - With. 287.

Corn-fields near Malton. Thorp-arch.

This is *C. leptophylla* in my former paper.

nodosa - - Hudf. 114. With. 289.

Tordylium nodosum, in my former paper.

Wall roots. Gravelly corn-fields.

scandicina - With. 289. *Scandix Anthriscus*. Hudf.

Garrison walls at Hull.

Scandix odorata - - Hudf. 124. With. 306.

In the wood at Knareborough, where
the

- the dropping well is. Near Leeds.
Mr. Wood, in *Withering*.
- Smyrnium olusatrum* - *Huds.* 126. *With.* 310. *Eng. Bot.* 330.
Near Beverley, rare. About Scarborough Castle. *Huds.*
- Athamanta Meum* - *Huds.* 116. *Linn.* *Æthusa Meum.* *With.* 305.
The mountainous parts of the West-riding, sparingly.
- Carum Carvi* - - *Huds.* 126. *With.* 311.
Meadows adjoining the river Humber near Hull, so plentifully that the poor people gather the seed to dispose of to the druggists.
On the Wolds near Lonsdalebrough.
- Pimpinella magna* - *With.* 313. *P. major.* *Huds.* 127.
About Knareborough. Helmsley. Castle Howard. Richmond.
- diffecta* - *Retz.* *With.* 312.
On the Wolds—near Beverley.
- Apium graveolens* - *Huds.* 128. *With.* 314.
Marshy ground near the sea. Hull.
- Sium repens* - - *Sibth. Oxon.* 97. *With.* 300.
Ditches about Beverley.
- Oenanthe crocata* - *Huds.* 121. *With.* 302.
River-sides, and ditches, in the North-riding.

TRIGYNIA.

- Sambucus Ebulus* - *Huds.* 130. *With.* 316.

Lund, in the East-riding. Many places
in the North-riding.

- Staphylea pinnata* - *Huds.* 131. *With.* 317.
Hedges near Pontefract. *R. Syn.*

TETRAGYNIA.

- Parnassia palustris* - *Huds.* 131. *With.* 319.
Wet meadows. Pastures, and heaths.

PENTAGYNIA.

- Statice Armeria* - - *Huds.* 132. *With.* 319.
Sea coast. Humber banks. Inglebc-
rough Hill.

HEXANDRIA MONOGYNIA.

- Galanthus nivalis* - *With.* 331.
Hedges, and orchards: probably from
gardens.

- Convallaria majalis* - *Huds.* 146. *With.* 341.
About Thorp-arch. Knaresborough.
Woods in Craven. Mr. Caley in *With.*

- multiflora* *Huds.* 147. *With.* 342.
Woods, at Studley Park.

- polygonatum* Helks-wood, at Ingleton, and other
rocky woods, near Settle. Sykes-
wood. Curtis.

- Narcissus biflorus* - *Linn. Eng. Bot.* 276. *With.* 332.
Banks of the river Wharf, at Thorp-
arch, in plenty. Mr. Knowlton.
Pseudo-

Pseudo-Narcissus - *Eng. Bot.* 17. *Huds.* 141. *With.* 332.

With the above, at Thorp-arch.

Juncus campestris - β . *Linn. Fl. Lapp. t.* 10. *f.* 2.

Marshes, and bogs, near Beverley.

I have sown the seeds, and it does not vary.

It is different (as the figure quoted above shews) from the *Gramen hirsutum elatius*, *panicula juncea compacta*. *R. Syn.* 416. which I believe will likewise be found to be a distinct species. I have not cultivated this, so as to be satisfied of it. *J. campestris*, var. *elatior*. *Sibth.*

fylvaticus - *Huds.* 151. *J. maximus*. *With.* 349.

Woods, common.

Acorus Calamus - - *Huds.* 147. *With.* 343.

Ponds, at Risby—near Beverley.

Allium Schoenoprasum *With.* 335.

Meadows, near Kirby-moor-side.

Mr. Flintoff, in *With.*

carinatum - *Huds.* 139. *With.* 333.

Among rocks, at Conystone, and Kilnsay. Curtis.

Ornithogalum umbellatum *Huds.* 143. *With.* 337.

In a field, near Knareborough. Mr. Robson, in *With.*

luteum *Huds.* 143. *With.* 336.

Wellburn, near Kirby-moor-side. Mr. Grimston. Near Greta-bridge, and Bignal.

Signal. R. Syn. and Mr. Robson. Near
Doncaster. Mr. Tofield. Under Mal-
ham Cove. Mr. Wood, in *With.*

TRIGYNIA.

- Triglochin maritimum* Hudf. 152. *With.* 359.
Sea-side. Humber banks, at Hull.
- Rumex digynus* - - Hudf. 156. *With.* 357.
Mountains, in the North and West
Ridings.
- maritimus* - Hudf. 155. *With.* 356.
Woodmansey, near Beverley.
- aureus* - - *With.* 356. β . *maritimus*. Hudf.
With the above, at Woodmansey.
- Colchicum autumnale* Hudf. 157. *With.* 359.
Near Ferrybridge. Knaresborough. South
Dalton.

POLYGYNIA.

- Alisma natans* - - Hudf. 158. *With.* 362.
Lake at Hornsea. I have not seen it in
flower.
- ranunculoides* Hudf. 158. *With.* 362.
 β . *ranunculoides*. Hudf.
Ditches, near Beverley.
- lanceolata* - *With.* 362. β . *A. plantago*. Hudf.
Marshes, near Beverley.

OCTANDRIA MONOGYNIA.

Epilobium tetragonum Hudf. 162. With. 368.

Woods, near Beverley; and in the North Riding.

alpinum - Hudf. 163. With. 368.

Sides of rivulets in the mountainous parts of the West Riding. Near Settle.

Chlora perfoliata - With. 369. Hudf. 168.

Upon the Wolds, near Beverley. Between Doncaster and Ferrybridge.

Vaccinium Vitis-idæa Hudf. 164. With. 371.

Heaths, in the North and West Ridings. Near Harrowgate.

Erica vulgaris -

Tetralix -

cinerea -

}
}
}

Varieties with white flowers, on heaths near Harrowgate.

TRIGYNIA.

Polygonum minus - Hudf. Ed. 1. 148. With. 380.

Woodmansey, near Beverley, in a place where water stands in the Winter.

viviparum Hudf. 169. With. 383.

Near Settle. Mr. Knowlton.

Wenfleydale. Curtis.

DECANDRIA MONOGYNIA.

Pyrola minor - - - Hudf. 176. With. 401.

Woods at Hackfall. Haslewood. Near Clapham.

Pyrola secunda - - Haslewood, near Sir Walter Vavasor's Park.
R. Syn.

Andromeda polifolia - *Huds.* 176. *With.* 398.

Upon the hills above Keighley, and abundantly on all that ridge of mountains which separates Yorkshire from Lancashire. Mr. Knowlton.

Bogs near Howden.

Arbutus uva ursi - *Huds.* 177. *With.* 399.

Specimens, from near Halifax.

DIGYNIA.

Saxifraga umbrosa - *With.* 403.

Reddins Gill, near Keighley. Mr. Knowlton.

<i>stellaris</i>	-	<i>Huds.</i> 179. <i>With.</i> 402.	} These are found on the rocky mountains in the West Riding. On Ingleborough, Hinkleyhaugh, Malham Cove, and in various places, about Settle, and Ingleton.
<i>oppositifolia</i>	-	-	
<i>autumnalis</i>	-	<i>Huds.</i> <i>aizoides.</i> <i>With.</i>	
<i>hypnoides</i>	-	-	
<i>angustifolia</i>	-	<i>Curtis.</i> -	

Saponaria officinalis - *Huds.* 183. *With.* 408.

Near Shipton, a village between York and Market Weighton. Cottingham-moor.

Dianthus Caryophyllus *Huds.* 184. *With.* 410.

On the walls, at Fountains Abbey.

TRIGYNIA.

- Silene nutans* - - *Huds.* 188. *With.* 413.
On the rocks, about Knaresborough.
- amoena* - - *Huds.* 188. *S. maritima.* *With.* 414.
Sea-side, at Hornsea.
- Stellaria media* - - *Sibth. Fl. Oxon.* 141. *S. glauca.* *With.* 420.
Marshes, near Beverley. First pointed
out to me by Col. Machell.
- uliginosa* - *With.* 420. γ . *S. graminea.* *Huds.* 190.
Marshes. Sides of ditches.
- Arenaria peploides* - *Huds.* 191. *With.* 421. *Eng. Bot.* 189.
At Hornsea. Bridlington Quay.
- verna* - - Mountains, about Settle.
- laricifolia?* - *Huds.* 192.
Upon Hinklehaugh.

PENTAGYNIA.

- Cotyledon lutea* - *Huds.* 194. *With.* 426.
Walls, and rocks, in the West Riding.
Mr. Tofield, in *Hudson*.
- Sedum Telephium* - *Huds.* 195. *With.* 426.
Walls, and rocks, in the North and
West Ridings.
- anglicum* - - *Huds.* 196. *With.* 428. *S. rubens.* *Lightf.*
Rocks, in the West Riding. Near Har-
rowgate.
- villosum* - - *Huds.* 197. *With.* 426.
Ingleborough, Hinklehaugh, Hartside
Hills, in the West Riding.
- Cerastium*

- Cerastium semidecandrium* Hudf. 200. *With.* 435.
 Barnby-moor, near Pocklington: this is
 not a common plant in Yorkshire.
- arvense - Hudf. 201. Borders of corn-fields.
- aquaticum Hudf. 202. *With.* 436.
 Sides of ditches, near Beverley.
- Spergula laricina* - Hudf. 203. *Lightf.* *S. faginoides.* Curtis.
S. fubulata. *With.* 436.
 Barnby-moor. Near Pocklington. Rare.

DODECANDRIA TRIGYNIA.

- Euphorbia stricta* - *Eng. Bot.* 333. *E. verrucosa.* Hudf. 209.
With. 449.
 Near York. *Ray's Syn.*

ICOSANDRIA MONOGYNIA.

- Prunus Padus* - - Hudf. 213. *With.* 455.
 Woods, and hedges, in the North and
 West Ridings. About Ingleborough.
Curtis.

DIGYNIA.

- Cratægus Aria* - - Hudf. 214. *With.* 458.
 Mountainous parts of the North and
 West Ridings. *Knarelsborough.*

PENTAGYNIA.

- Spiræa falicifolia* - *With.* 463.

In a hedge between Green Hammerton and Knaresborough, far from any house or garden; and as Dr. Withering informs us that it has been found in Westmoreland and Cumberland, I have now ventured to add it to our Yorkshire catalogue.

POLYGYNIA.

Rosa villosa - - *Huds.* 219. *With.* 466.

Woods, hedges, and shady situations—very common.

Rubus chamæmorus - *Huds.* 221. *With.* 471.

In peat earth, on the tops of the highest hills. Ingleborough. Kirby Fell, Fountains. Bulsworth. Hinklehaugh.

Geum intermedium - *Curtis.* *G. rivale.* var. 2. *With.* 478.

Woods in the North Riding. Walkington-wood, near Beverley; found there by the Rev. Mr. Rigby.

Potentilla fruticosa - *Huds.* 222. *With.* 472.

On the South banks of the Tees, below Thorpe, and Eggleston Abbey, and also near Greta Bridge, and Mickelforce Teesdale. *R. Syn.* It still grows abundantly in the above places. Mr. Robson, in *With.*

Dryas octopetala - *Huds.* 226. *With.* 478.

On Arncliffe Clowder, in Littendale, near Kilnsay. *Curtis.* Near Settle. Dr. Fell. In the Craven part of Yorkshire. Mr. Wood. *Withering.*

POLYANDRIA MONOGYNIA.

- Chelidonium glaucium* Hudf. 229. With. 484.
Sea-side, in various places. Hornsea.
Bridlington Quay.

PENTAGYNIA.

- Aquilegia vulgaris* - Hudf. 235. With. 495.
Westwood, at Beverley. Upper part of
Girling Trough, near Conistone, Kiln-
say. Curtis.

POLYGYNIA.

- Anemone Pulsatilla* - Hudf. 237. With. 498.
Dry pastures, in the neighbourhood of
Pontefract.
- Thalictrum minus* - Hudf. 238. With. 501.
Thorpe-arch. About Settle, and In-
gleton.
- majus* - With. 502. Jacq. austr. 420.
In Holderness, by Mr. Knowlton: he
cannot recollect the exact spot.
- Helleborus foetidus* - Hudf. 245. With. 510.
In Lanes at Campfall, near Doncaster.

DIDYNAMIA GYMNOSPERMIA.

- Mentha sylvestris* - Hudf. 250. With. 521.
At Thorn. Mr. Robson, in *Withering*.
- rotundifolia* - Hudf. 251. With. 522.
Near

- Near Saltburn, by the sea, in a dry sandy place. Mr. Robson, in *Withering*.
- Mentha pulegium* - Wet commons. Near Terrington.
- Galeopsis villosa* - *Huds.* 256. *G. grandiflora.* *With.* 528.
Sandy corn-fields. Not uncommon.
- Tetrahit* - *δ. Huds.* 257. *G. cannabina.* *With.* 529.
Corn-fields, between Beverley and Sancton. Near Green Hammerton.
- Galeobdolon luteum* - *Huds.* 257. *With.* 530.
Woods, at Bingley. Mr. Knowlton.
- Stachys arvensis* - *Huds.* 260. *With.* 532.
Common, in light arable land. Near Malton. Walkington, near Beverley.
- Leonurus Cardiaca* - *Huds.* 261. *With.* 534.
Between Tickhill and Workop. *Huds.*
- Origanum Onites* - *Huds.* 262. *O. vulgare.* var. 2. *With.* 535.
About Clapham. Mr. Caley, in *With.*
- Melissa Calamintha* - *Huds.* 263. *With.* 538.
Dry banks, near Bishop Burton.
- Nepeta* - - Neighbourhood of Malton.

ANGIOSPERMIA.

- Orobanche elatior* - *Trans. Linn. Soc.* vol. 4. 178.
This is the *O. major*, in my former paper.
- Melampyrum cristatum* *Huds.* 269. *With.* 544.
Among corn, at Waltonfield, near Wakefield. *With.*
- pratense* *Huds.* 270. *With.* 545.
Woods,

Woods at Beverley. At North Bierley.
Dr. Richardson.

Melampyrum sylvaticum Woods at Castle Howard.

Antirrhinum Cymbalaria Hudf. 271. *With.* 549.

On walls at Londefbrough, where it was
planted by the late Mr. Knowlton,
and is naturalized, as on the walls
London.

minus - Malton, and Walkington fields.

majus - Garden walls, and churches, in and near
towns.

TETRADYNAMIA SILICULOSA.

Myagrum fativum - *Hudf.* 277. *Moenchia fativa.* *With.* 562.

Among clover at Esk, near Beverley:
possibly the seed of the clover might
have been foreign, and this plant in-
troduced with it. I have frequently
seen it mixed with foreign flax seed.

Bunias Cakile - - *Hudf.* 298. *With.* 562.

Sea-shore, Hornsea.

Draba muralis - - *Hudf.* 278. *With.* 566.

Fissures of the limestone rocks, about
Settle, Ingleton, and Malham.

incana - - I found this in the same situations as the
last, but sparingly. On a rock near the
summit of Ingleborough, on the west
side.

fide. Mr. Woodward. *With.* Roseberry
Coppin. Mr. Robson.

Lepidium latifolium - *Huds.* 279. *With.* 567.
Amongst the rocks at Plumpton. In
the neighbourhood of Knarefborough.

Thlaspi arvense - *Huds.* 281. *With.* 568.
Corn-fields, between Londefbrough and
Shipton. Mr. Knowlton.

campestre - Sandy fields. Not uncommon.

montanum - *Huds.* 282. *With.* 570.
Mountainous pastures, about Settle, and
Ingleton. Near the ebbing and flow-
ing Well. *Huds.*

alpestre - *Eng. Bot.* 81. *With.* 570.
Moist limestone pastures, about Settle.

Cochlearia officinalis - *Huds.* 283. *With.* 572.
Sea-shore. Ingleborough Hill.

groenlandica Ingleborough Hill. Flamborough Head.

Armoracia Banks of rivers. Beverley.

SILIQUOSA:

Cardamine bellidifolia *Huds.* 293. *With.* 577.
Said to grow in various places, about
Ripon, in *R. Syn.* I could not meet
with it.

impatiens Sides of rivulets in the North and West
Ridings. About Settle. Near Richmond.

flexuosa - *With.* 578.

I have

I have specimens gathered in the North Riding, but cannot recollect the place.

Sisymbrium sylvestre - *Huds.* 296. *With.* 581.
Marshes, and sides of ditches, at Beverley.
Near Leeds. Mr. Wood, in *With.*

terrestre - *With.* 582. *Curt.* 289.

At Cottingham.

Cheiranthus Cheiri - *Huds.* 287. *With.* 586.

Old walls, about towns.

Arabis thaliana - *Huds.* 292. *With.* 587.

Sandy dry banks. On walls.

Turritis hirsuta - *Huds.* 291. *With.* 589.

On the Wolds, near Beverley, and many other places.

Brassica oleracea - *Huds.* 289. *With.* 591.

Sea cliffs at Staiths. Mr. Robson, in *With.*

muralis - *Huds.* 290. *With.* 592. *Sisymbrium mu-*
rale. Linn.

Garrison walls at Hull. Old walls at Malton.

MONADELPHIA DECANDRIA.

Geranium moschatum *Huds.* 300. *With.* 609.

Craven. *R. Syn.* Hornsea. *With.*

phæum - In woods, about Settle, and Ingleton.

sylvaticum Woods, and hedges, near the Wharf, at
Bolton.

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Bolton. Mr. Knowlton. About Settle, and Ingleton.

Geranium pyrenaicum Banks of the river, between Bingley and Keighley. *Huds.*

lucidum - Walls, and stony places, in the North and West Ridings.

columbinum I have specimens which I collected in the East Riding, but cannot recollect the place.

pusillum - *Linn.*—*parviflorum*. *Sibth. Fl. Oxon.* *Ray's Syn. t. 16. f. 2.*

Sandy banks, at Bridlington Quay. Kexby Bridge, near York.

DIADELPHIA HEXANDRIA.

Fumaria capreolata - *With.* 621. *F. officinalis*. β . *capreolata*. *Huds.* 309.

Stony places, at Harrowgate, and Thorpe-arch.

claviculata - Among the rocks of Stonehall, seven miles from Leeds. Mr. Wood, in *With.*

DIADELPHIA DECANDRIA,

Ulex europæus - - β . *Huds.* *Genista spinosa minor*. *Park.* 1003: On heaths, in the southern part of the county.

- Obs.* This is certainly a species. See *R. Syn.* and *With.*
- Ononis arvensis* - - *With.* 627. *O. inermis.* *Huds.* 312.
Pastures, heaths, and meadows.
β. repens. *Huds.*
Sea-shore, at Hornsea.
- Anthyllis vulneraria* *Huds.* 313. *With.* 629.
Meadows, and pastures, in gravelly and calcareous soils. Sea-shores.
- Lathyrus Nissolia* - *Huds.* 315. *With.* 632.
At Sigglesthorne, commonly called Silston, in Holderness, found there by Mrs. Wharton.
- palustris* - In the marshes, near Beverley, abundantly.
- Vicia lathyroides* - *Huds.* 318. *With.* 638. *Eng. Bot.* 30.
Under hedges, and bushes, in dry pastures. Near Beverley.
- bithynica* - - Gravelly corn-fields, and pastures, and ditch banks, near Doncaster. Mr. To-field, in *Huds.*
- Hippocrepis comosa* - *Huds.* 321. *With.* 641. *Eng. Bot.* 31.
Limestone rocks, at Malham, Settle, and Ingleton. Common in various parts of the North and West Ridings, but never saw it in the East.
- Astragalus glycyphyllos* *Huds.* 322. *With.* 643.
Near Flaxby, a village near Knaresborough.

Trifolium

Trifolium ornithopodioides Hudf. 324. *T. melilotus ornithopodioides*. With. 645. *R. Syn.* 331. t. 14. f. 1.

Half a mile from Tadcaster, towards Sherborn. *R. Syn.*

striatum - Hudf. 327. With. 649.

Sandy fields, at Leven in Holdernefs. Near Castle Howard.

alpestre - Hudf. 326. *T. medium*. With. 650.

Among bushes. Edges of woods. Seashore, at Bridlington Quay.

SYNGENESIA POLYGAMIA ÆQUALIS.

Lactuca virofa - - Hudf. 337. With. 677.

On dry banks, and in hedges. Near Beverley.

Picris echioides - - Hudf. 342. With. 673.

Sides of ditches, in lanes, near Beverley.

Hieracioides - With. Hedypnois *Hieracioides*. Hudf. 342.

Borders of corn-fields, where the land is stony.

Leontodon palludosum Lightf. Fl. Scot. 432. L. *Taraxacon*.

With. 679. L. *Taraxacum*. ♂ *palustre*.

Hudf. 339.

Sides of ditches, in the marshes, Beverley.

hirtum - With. 682. Hedypnois *hispidum* ♂ *hirtum*.

Hudf. 340.

Near Beverley.

Hieracium

- Hieracium murorum* - *Huds.* 344. *With.* 686.
Woods, and rocky places, in the North
and West Ridings. About Castle
Howard. Bolton Abbey. *With.*
- villosum* - *With.* 687. *Jacq. austr.* 87.
Clefts of rocks, near Mur Gill, at the
foot of Ingleborough. Mr. Caley, in
With.
- Crepis biennis* - - *With.* 690. *Hedypnois biennis.* *Huds.* 342.
On the Wolds, west of Bishop Burton.
Rare.
- Hypochæris maculata* *Huds.* 346. *With.* 691.
Near Ottermine cove, Settle. Mr. Caley,
in *With.*
- glabra* - *Huds.* 347. *With.* 692.
On the common, close to the inn, at
Banktop, near Barnsley. Mr. Wood,
in *With.*
- Cichorium Intybus* - *Huds.* 348. *With.* 693.
Borders of corn-fields, common in the
North and West Ridings, but I have
not seen it in the East Riding.
- Serratula tinctoria* - *Huds.* 349. *With.* 695.
Near Londesbrough. — This is one of
the plants which are rare in the East
Riding, but common in the other two.
- Carduus eriophorus* - *Huds.* 354. *With.* 700.
Road sides, in various parts of the
county.

county. Between Market Weighton and Londefbrough.

Carduus pratensis - *Engl. Bot.* 177. *Huds.* 353. *With.* 701.
Houghton moor.

helenioides - *Huds.* 352. *With.* 702.

In a wood near Londefbrough; shewn me by Mr. Knowlton. Rocky pastures, in the mountainous parts of the county.

Carlina vulgaris - - *Huds.* 355. *With.* 704.

Dry pastures, and heaths. Near Beverley.

POLYGAMIA SUPERFLUA.

Artemisia maritima - *Huds.* 358. *With.* 709.

Banks of the Humber, at Hull.

Conyza squarrosa - - *Huds.* 362. *With.* 717.

In the North and West Ridings. Thorpe arch. Mr. Grimston.

Erigeron acre - - *Huds.* 363. *With.* 718.

On the Wolds, frequent.

Tuffilago hybrida - *Huds.* 364. *With.* 721.

Near the river Wherf, between Ilkley and Skipton, in Craven.

Senecio faracenicus - *Huds.* 367. *With.* 726.

Near Halifax, in the fields, about Salkeld. *R. Syn.* About Clapham, and Ingleton. *Huds.*

Solidago cambrica - - *Huds.* 367. *With.* 728.

Mountains

Mountains in the West Riding.

On the rocky precipice on the summit of
Ingleborough, to the north-west. Mr.
Woodward, in *With*.

After Tripolium - *Huds.* 368.

β . *Lightf.* Var. 2. *With*.

Sea-shore at Hornsea.

Doronicum Pardalianches *With.* 732.

Near the World's end, at Harrowgate.

Mr. Manby, in *With*.

Matricaria maritima - *With.* 736. *M. inodora.* γ . *Huds.* 373.

Flamborough Head. Rare.

POLYGAMIA FRUSTRANEA.

Centaurea Calcitrapa *Huds.* 376. *With.* 745.

Sands end, near Whitby. Mr. Robson,
in *With*.

MONOGAMIA.

Jasione montana - - *Huds.* 377. *With.* 247.

Bulmer corn-fields. Sandy fields, be-
tween Weighton and Sancton.

Obs. I have seen this plant upon heaths, with
all the appearance of a perennial root ;
and Mr. Swainston's gardener shewed it
to me in his master's fine collection,
where it is assuredly perennial.

Viola hirta - - *Huds.* 379. *With.* 260.

Woods at Castle Howard.

Londesbrough, and Thorpe arch. Mr.
Knowlton.

Viola arvensis - - foliis ovato-oblongis dentatis, floribus calyci hirsuto æqualibus. *Hoffm. Germ. Fl.* 311.

Sandy soil, in arable land, very frequent.

Impatiens noli-me-tangere *Huds.* 380. *With.* 263.
Roots of the old walls in Fountains Abbey.

GYNANDRIA DIANDRIA.

Orchis latifolia - - *Huds.* 385. a variety with straw-coloured flowers.

Bogs, and marshes, near Beverley.

Ophrys aranifera - - *Huds.* 392. *With.* 39.

Dry pastures, about Branham (probably Bramham) near Tadcaster. *With.*

Cypripedium Calceolus *Huds.* 392. *With.* 43.

About Arncliffe, Kilnsay, Litten, and Kettlewell. Mr. Knowlton.

I believe this plant is nearly eradicated in Helks-wood.

Serapias ensifolia - - *With.* 42. *S. longifolia. γ. Huds.* 394.

Woods at Settle, and Ingleton: Helks-wood. In Cum Hag, a wood at Castle Howard. This is *S. longifolia* in my former paper.

rubra - - *With.* 42. *Engl. Bot. S. longifolia. δ. Huds.* 394.

About Clapham, and Ingleton, *Huds.*

I have a specimen of this rare plant, but cannot recollect where it was found.

MONOECIA DIANDRIA.

Lemna gibba - - *With.* 44. *L. minor.* β . *gibba*, *Huds.* 399.
Ditches at Beverley.

TRIANDRIA.

Typha angustifolia - - *Huds.* 400. *With.* 111.
Old marle-pits, between York and Market Weighton.

Sparganium natans - - *With.* 112. *Engl. Bot.* 273. *S. simplex*,
natans β . *Huds.* 401.
Ditches in Swinemoor, at Beverley.

Carex dioica - - *Goodenough. Trans. Linn. Soc. vol. 2.* 139.
Huds. 401. *With.* 86.
In bogs, very frequent.

pulicaris - - *Leers, t. 14. f. 1.*
Bogs, wet meadows, and pastures.

stellulata - - *C. muricata.* *Huds.*
Bogs, marshes, sides of rivulets.

curta - - *C. brizoides.* *Huds.* *C. canescens.* *Lightf.*
I have only found this rare species in
Terrington Can.

ovalis - - *C. leporina.* *Huds.* *Lightf.*
Woods, and moist clayey pastures.

remota - - Woods, and sides of ditches.

axillaris - - Sides of ditches, at Beverley, shewn me by
Colonel Machell.

Carex arenaria - - *With. ed. 3. p. 90. t. 20.*

Low grounds, near Hull bridge, and
Grove-hill at Beverley.

intermedia - *C. disticha. Hudf. Lightf.*

— *arenaria. Leers, t. 14. f. 2.*

Wet pastures, and meadows, frequent.

There seems to be more than one species
included in this name.

divisa - - *Transf. Linn. Soc. vol. 2. p. 157. t. 19. f. 2.*

In a meadow, called Derricots, near Hull.

I never met with it in any other place.

muricata - *C. spicata. Hudf. Lightf.*

Woods. Pastures. Meadows.

I have seen this, or one in the same way,
on the driest sandy land, in which situa-
tion the capsules do not divaricate near
so much as when growing in more moist
places.

vulpina - - Sides of ditches, under hedges, in woods.

teretiufcula - *Transf. Linn. Soc. vol. 2. p. 163. t. 19. f. 3.*

Arram Car, near Beverley, abundantly.

paniculata - Sides of ditches. Marshes. Woods.

Obs. We have in the marshes a variety of
this, with a small compact panicle, which
never forms itself into large tufts, as the
C. paniculata does. It probably may be
a distinct species.

præcox - - *C. montana. Hudf. Lightf.*

Dry pastures, and heaths. Common.

filiformis - *Transf. Linn. Soc. vol. 2. p. 172. t. 20. f. 5.*

C. tomentosa. *Lightf.*

In all the watery marshes about Beverley, very common.

Carex flava - - - Wet pastures. Bogs. Sides of rivulets.

extensa - - - *Transf. Linn. Soc. v. 2. p. 175. t. 21. f. 7.*

Wet pastures, near Beverley.

I am not certain that this is the plant which Dr. Goodenough means.

fulva - - - Wet pastures, and meadows, in various places. Near Beverley.

I have ventured to continue this, as the figure quoted by Dr. Goodenough in *Fl. Dan.* 1049 is a good representation of my plant, and it is certainly different from any of the varieties of the *C. flava*. It is also always a much weaker and smaller plant in all its parts than the *C. distans*.

distans - - - Woods. Pastures. Meadows.

panicea - - - Wet pastures. Meadows, and marshes.

fylvatica - - - Woods, and hedges.

recurva - - - *Leers, t. 15. f. 3.*

Heaths. Meadows, and pastures.

pallefcens - - *Leers, t. 15. f. 4.*

Woods. Pastures, and meadows.

limosa - - - Bogs, near Terrington. Rare.

Pseudo-cyperus *Huds. Lightf. Ger. em. 29. f. 2.*

In a place called Dumble pit, near Beverley; the only place I have seen it in, in the North.

- Carex pilulifera* - - *Huds. Lightf. Leers, t. 16. f. 6.*
Woods. Heaths, and pastures.
- cæspitosa* - - *Transf. Linn. Soc. vol. 2. p. 195. t. 21. f. 8.*
In marshes, and sides of rivers, and ditches.
- stricta* - - *Transf. Linn. Soc. vol. 2. p. 196. t. 21. f. 9.*
C. cæspitosa. Huds.
Marshes, and sides of ditches.
- riparia* - - *C. acuta. var. α. Huds. Lightf.*
Banks of rivers. Wet meadows.
- paludosa* - - *C. acuta. Fl. Lond.*
Sides of ditches, and rivers.
- acuta* - - *C. gracilis. Fl. Lond.*
Banks of rivers. Beverley.
- vesicaria* - - *C. inflata. Huds. Lightf.*
Leers, t. 16. f. 2. III.
Ditches, at Beverley. Hull. Cottingham.
- ampullacea* - *C. vesicaria. Huds. Lightf.*
Sides of rivers. Wet meadows, and
marshes. Frequent.
- hirta* - - *Huds. Lightf. Leers, t. 16. f. 3.*
Woods. Wet meadows, and pastures.

POLYANDRIA.

- Ceratophyllum demersum?* *Huds. 419. With. 440.*
In a rivulet, near Harrowgate. I have
not seen the fructification.
- Myriophyllum spicatum* *Huds. 419. With. 389.*
Ponds at Castle Howard, and Londef-
brough.

Myriophyllum verticillatum Ditches about Beverley.

DIOECIA DIANDRIA.

Salix triandra - - *Huds.* 425. *Wib.* 45.

Hedges. Osieries. Banks of rivers.

pentandra - Sides of rivers. Rivulets. Ditches.

Near Beverley, and in most parts of the county.

vitellina - - In osieries.

amygdalina - Hedges. Sides of ditches.

fragilis - - Sides of rivers, and ditches.

Helix - - River sides.

purpurea - - *Linn.* *Huds.*

About Beverley.

This, and the *S. Helix*, are by some authors supposed to be one species, and they have named it *S. monandra*.

I have observed the following distinctions, in their native places of growth :

In the month of March, previous to their flowering, the bark of the young shoots of the *S. purpurea* is of a dark purple, and the scales of the buds are a fine red, (almost scarlet,) generally tipped with black, and before they drop off they turn wholly black; at the same time, the bark of the young shoots of the

S. Helix is of a yellowish brown, and the scales of the buds are always of a pale brown, or chesnut colour.

I have seen but few female plants of the S. purpurea; they seem to be rare.

- Salix myrsinitis - - On the slope of a high hill, between Kiln-fay and Arncliffe. *Curtis.*
- herbacea - - Ingleborough, and other high mountains, in the North and West Ridings.
- reticulata - - On the rocks on the uppermost part of Ingleborough, on the north side; and on a hill called Whern-side, over against Ingleborough, on the other side the subterraneous river. *R. Syn.*
- repens - - Heath. Several varieties of it.
- fusca - - *Linn.* S. arenaria. *Lightf.*
Near Beverley.
I have one variety with stipulæ, and another without.
- rosmarinifolia - On the edge of a rivulet which runs into Semer-water, Wenfleydale. *Curtis.*
Arram Car, near Beverley?
- caprea - - Woods. Hedges.
- acuminata - *Hoffm.* Sides of ditches. Hedges.
- aurita - - S. caprea. *J. Hudf.*
Woods, near Beverley.
- cinerea - - *Willd.* Woods, and hedges.
- viminalis - *Osieries.* Sides of ditches.
- alba - - By rivers and ditches.

TETRANDRIA.

Hippophae Rhamnoides Hudf. 431. With. 204.

On the sea-bank, between Whitby and
Lyth. R. Syn.

Myrica Gale - - Hudf. 432. With. 208.

Houghton-moor.

OCTANDRIA.

Rhodiola rosea - - Hudf. 434. With. 389.

Rocks on Ingleborough Hill.

POLYGAMIA MONOECIA.

Atriplex laciniata - Eng. Bot. 165. With. 274.

Sea-shore, at Hornsea.

ferrata - - Hudf. 444. A. littoralis. With. 275.

Humber banks, at Hull.

littoralis - Hudf.

Sea-side, at Hornsea.

CRYPTOGAMIA FILICES.

Osmunda regalis - Hudf. 449. With. 763.

In a plantation, belonging to Lord
Loughborough, at Harrowgate. Near
Ripley.

About Keighley. Mr. Knowlton.

74 Mr. TEESDALE'S Supplement to the *Plantæ Eboracenses*.

Osmunda Lunaria - β . *Huds.* 449.

By the side of the Lake at Hornsea.

crispa - - *Huds.* 450. *Pteris crispa*. *With.* 764.

Ingleborough Hill. Haworth, near
Halifax. Mr. Knowlton.

Blechnum Spicant - *With.* 765. *Osmunda Spicant* *Huds.* 450.
Woods, and heaths.

Pteris aquilina - - Every-where.

Achrostichum septentrionale *Huds.* 450. *With.* 764.

Ingleborough Hill. Mr. Tofield, in *Huds.*

Asplenium Ceterach - *Huds.* 452. *With.* 767.

Limestone-rocks, near Malham Tain, in
Craven. *R. Syn.* And found lately
in the same place by Mr. Knowlton.

Trichomanes β . *ramosum*. *Huds.*

Ingleborough Hill. Hornby Hills. Rare.

viride - *Huds.* 453. *With.* 768.

On Ingleborough, and near Malham.

On walls, and rocks, above Settle. Mr.
Knowlton.

viride - var. 3. *With.* *A. ramosum*. *Linn.*

Ingleborough, and on limestone rocks,
in the neighbourhood of Settle and
Ingletton. Rare.

lanceolatum *Huds.* 454. *With.* 770. *Engl. Bot.* 240.

On a wall in the village of Wharf. Bolton.

Polypodium Lonchitis *Huds.* 455. *With.* 773.

Near Bingley. *Huds. ed. 1.*

Poly-

Polypodium fragile - Rocky parts of the North and West Ridings. About Knaresborough and Harrogate.

rhætium Hudf. 458. With. 780.

Near Fountain's Abbey. On rocks, about Knaresborough.

Trichomanes pyxidiferum Hudf. 461. *R. Syn.* 127. t. 3. f. 3. 4.

In September 1782 I found this rare plant in Belbank wood, near Bingley, the place mentioned in *R. Syn.*; whether it be only a variety of the following, I leave to the decision of those who may have frequent opportunities of examining it, in the places of its growth.

tunbridgensis On the rock called Foal-foot, Ingleborough Hill. Bolton. This is the *Hymenophyllum tunbridgensis* of Dr. Smith.

MUSCI.

Lycopodium alpinum Hudf. 464. With. 759.

On the summit of Ingleborough, and other high hills in that part of the county.

About Keighley. Whitby. Mr. Knowlton.

Trentipohlia erecta - Hoffm. *Germ. Fl.* v. 2. p. 17. t. 14. *Fl. Dan.* 215.

I found this in a bog near Beverley, and could not guess what it was until I met with it figured in Hoffman.

Phascum cuspidatum Sibth. Oxon. 273. Schreb. t. 1. f. 1. 2.

Woods, and dry banks. XII.—III.

curvicollum Dickf. f. 2. p. 1. With. 786.

On the wolds, between Beverley and Market Weighton. III.

axillare - Dickf. f. 1. p. 2. t. 1. f. 3. P. nitidum.

With. Hoffm.

Sides of ditches, and in woods, at Beverley. X.—XII.

ferratum - Dickf. f. 1. p. 1. t. 1. f. 1. With. 785.—velu-

tinum? Hoffm. Schr. de Phas. t. 2.?

In a wet pasture, called Swinemoor, at Beverley, and in arable lands among stubble. XII.—III.

muticum - With. 784. Schreb. Phasc. t. 1. f. 11. 12.

β. acaulon. Hudf. 466. Dill. t. 32. f. 12.

Garden walks. Mud walls. Dry banks. XII.—III.

crispum - caulescens, foliis lanceolatis longè acuminatis, revolutis-contortis. Hedw. 1. t. 9.

Hoffm. Germ. Fl. 20.

Sides of ditches, in Figham, at Beverley. III.

Obs. I sent specimens of this to my friend Mr. Dickson, who named it, and added, that it had not been found in Britain before.

Splachnum angustatum Dickf. f. 2. p. 3. With. 792.

In a bog, near Cottingham. Rare. IV. V.

vasculosum Hudf. 469. With. 791.

Moist mountains, and heaths. Hudf.

Fontinalis alpina - *Dicks. f. 2. p. 2. t. 4. f. 1. With. 789.*
Mountain rivulets, in the North and
West Ridings. This is *F. minor* in
my other paper.

minor - *Huds. 468. With. 788.*
In rivulets, above Helmsley. Hornby
Hills.

squamosa - *Huds. 467. With. 788.*
Rivulets, in the West Riding.

Mnium arcuatum - *Dicks. f. 3. p. 2. With. 803.*
In the boggy part of Houghton-moor.
In Greenfield, Saddleworth. *With.*

Polytrichum subrotundum }
nanum - }
aloides - } On heaths. Earthen walls. Dry banks.
commune - }
piliferum - }

I found the last, with quinquefid cap-
sules, at Harrowgate.

strictum - }
rubellum - } Upon heaths.
urnigerum - Ingleborough Hill. Among the rocks
on Hornby Hills.

alpinum - At Castle Howard. Ingleborough.

Orthotrichum crispum *Hoffm. Germ. Fl. 25. Dill. t. 55. f. 12.*
anomalum — — — — *f. 9.*
striatum — — — — *f. 8.*
affine *Hoffm. Germ. Fl. p. 26.*

Ortho--

Orthotrichum diaphanum Schrad.

On trunks of trees, and rocks.

Bryum apocarpum - var. 2. *With.* *Hedwigia ciliata.* *Hedw.*
Dill. t. 32. f. 5.

On rocks, in the North and West Ridings.

strictum - - *Hoffm. Germ. Fl. 36. β. purpureum. γ. Hudf.*
Dill. t. 49. f. 52.

In bogs. III. IV.

aciculare - *Hudf. 479. Dicranium aciculare. Swartz.*
Dill. t. 46. f. 25.

On stones, in mountainous rivulets.

At Harrowgate. VIII.—IX.

bipartitum - *Dicks. f. 2. p. 7. With. 835. Dill. t. 49. f. 50.*
Walls, and ditch banks. II. III.

calcareum - *Dicks. f. 2. p. 8. t. 4. f. 3. Engl. Bot. 191.*
With. 812.

On chalk-stones, near Bishop-Burton.
Rare.

canescens - *With. 825. Trichostomum canescens. Hedw.*
Dill. t. 47. f. 27. D. E. F.

On heaths: Harrowgate. Houghton-moor.

lanuginosum - *Swartz. Hoffm. Germ. Fl. 41. Dill. t. 47. f. 32.*
On heaths.

capillaceum - *Dicks. f. 1. p. 4. t. 1. f. 6. With. 831.*
β. æstivum. Hudf.

Ingleborough Hill. VIII.

cuneifolium - *Dicks. f. 3. p. 7. Dill. t. 45. f. 15.*
Earthen walls, and dry banks. XI. XII.

Bryum

- Bryum curvirostrum* - *Dicks. f. 2. p. 7. Dill. t. 48. f. 45.*
Dry stony places, near Beverley. XII.—II.
- barbatum* - - *Curt. Dill. t. 48. f. 48. With. 829.*
Westwood, at Beverley. III.
- flexuosum* - *Huds. 484. With. 834. Dill. t. 47. f. 33.*
On heaths very common, but not in
fructification.
- rigidum* - - *Huds. 477. With. 813. Dill. t. 49. f. 55.*
Rocks, on Ingleborough. *Huds.*
- fragile* - - *Dicks. f. 3. p. 5. Dill. t. 47. f. 33. F. G.*
Woods, and heaths. VII.
- Heimii* - - *Dicks. f. 2. p. 4. With. 815. β. truncatu-*
lum. Linn. et Huds. Dill. t. 45. f. 7. I. K.
Walls, and dry banks. XI.—III.
- pellucidum* - *Huds. 481. Mnium pellucens. With. 802.*
Dill. t. 46. f. 23.
On large stones, by the side of a rivulet,
north of Harrowgate. VIII.—X.
- ovatum* - - *Dicks. f. 2. p. 4.*
Mud walls, and dry banks. XI. XII.
- verticillatum* - *Huds. 485. With. 821. Dill. t. 47. f. 35.*
On moist rocks, Yorkshire. Dr. Ri-
chardson.
- polyphyllum* - *Dicks. f. 3. p. 7. Dill. t. 48. f. 41.*
Birmham rocks, near Ripley. VIII.
- brevifolium* - *Dicks. f. 2. p. 4. Dill. t. 47. f. 39.*
Bogs, in Yorkshire. *Dill.*

Bryum

Bryum virens - - *Dicks. f. 1. p. 4. Dill. t. 48. f. 43.*
Dry banks. Sandy pastures. XII.—III.
This is the *B. viridulum* in my former paper.

mucronulatum *Dicks. f. 3. p. 3. With. 817.* "
Sides of ditches, near Beverley. III. IV.
Obs. The acuminated part of the Calyptra is frequently black.

lanceolatum - *Dicks. f. 3. p. 4. With. 824.*
Mud-walls. Hedge-banks. I.—III.

fallax - - *Dicks. f. 3. p. 5. With. 833.*
In Yorkshire. *Dicks.*

ventricosum - *Dicks. f. 1. p. 4. B. triquetrum. Hudf. 490. Dill. t. 51. f. 72.*
Bogs on heaths. IV. V.

- *γ. triquetrum. Hudf. 491. Mnium nutans. With. 803. M. turbinatum. Hoffm. Germ. Fl. 49. Dill. t. 51. f. 74.*
Bogs, and marshy grounds.

bimum - - *Schreb. M. bimum. Hoffm. Germ. Fl. 48. β. B. triquetrum. Hudf. Dill. t. 51. f. 73.*
In bogs. IV. V.

crudum - - *Hudf. 491. Dill. t. 50. f. 70.*
Woods, in the East and North Ridings. V. VI.

Hypnum trichomanoides *With. 484. H. complanatum. β. Hudf. Dill. t. 34. f. 8.*

Leskia trichomanoides. Sibth. Fl. Oxon. 303.
Trunks of trees. Beverley.

Hypnum ruscifolium - *Dicks. f. 3. p. 10. With. 848. Dill. t. 38. f. 31.*

Banks of rivers. On stones in rivulets.
IX. X.

lutescens - *Hoffm. Germ. Fl. 75. Dill. t. 42. f. 60. H. lutescens. Hudf. ?*

Dry stony banks, between Beverley and Newbold. III. IV.

caffubicum - *Dicks. f. 3. p. 10. With. 849.*

In woods, and hedge-banks, near Beverley.

intricatum - *Eng. Bot. 202. With. 849.*

Roots of trees, near Beverley.

fluitans - *With. 851. Dill. t. 38. f. 33.*

In the marshes, near Beverley.

I have not seen it in fructification.

compressum - *Hudf. 498. Dill. t. 36. f. 22.*

Trunks of trees. II. III.

murale - *Dicks. f. 3. p. 10. H. myosuroides. γ. Hudf. Dill. t. 41. f. 52.*

IX. IX Upon the old walls, at Risby, near Beverley.

molle - *Dicks. f. 2. p. 11. t. 5. f. 8. With. 862.*

Rocks, at Crambe Beck Bridge, between York and Malton.

filiforme - *Hudf. 497. Dill. t. 42. f. 62. H. filifolium. With.*

Trunks of trees. XII.—III.

illecebrum? - *Hudf. 504. With. 862. Dill. t. 40. f. 46.*

On the Wolds, in stony places. II. III.

Hypnum atro-virens - *Dicks. f. 2. p. 10. Dill. t. 43. f. 67.*
Shady woods in the North Riding,
IX.—XII.

myofuron - *With. 865. β. myofuroides. Hudf. Dill.*
t. 41. f. 50.
Roots of trees, in woods.

friatum - *With. 850. γ. rutabulum. Hudf. Dill. t. 38.*
f. 30.
Roots of trees. Under hedges. XII.—II.

prolixum - *Dicks. f. 2. p. 13. Dill. t. 85. f. 20.*
β. Hypnum riparium. Weber.
On stones, in mountainous rivulets, in the
North Riding. Mill-dams.

paludosum - *furculis confertis decumbentibus, ramis*
simpliciusculis erectis teretibus acutis;
foliis ovato-acutis subsecundis; capsulis
cylindraceis obliquis. Swartz.
Leskia paludosa. Hedw. et Swartz.
About the roots of willows, in the marshes
near Beverley. XI. XII.

muticum - *furculis plano-pinnatis, apice attenuatis,*
foliis ovato-lanceolatis appressis enerviis.
β. purum. Hudf. Dill. t. 40. f. 47.
H. Schreberi. Swartz. Aët. Stockh. 1795.
H. compressum. Hoffm. but not of Linn.
On heaths.

lacunosum - *caule et furculis incrassatis, foliis ovato-*
acuminatis incurvatis secundis enerviis
lacunosis.

lacunosis. *Hoffm. Germ. Fl.* 63. *Dill. t.* 37.
f. 24. c.

Molescroft-car, near Beverley.

ALGÆ.

Jungermannia cochleariformis *With.* 876. *J. purpurea. Lightf.*
Mnium Jungermannia. Linn.
Dill. t. 69. f. 1.

Moist heaths——rarely found in
fructification. I once found it
in that state near Harrowgate.
VIII. IX.

ventricosa - *Dicks. f.* 2. p. 14. *Dill. t.* 70. f. 14.
Bushypastures, near Beverley. IV.

ovata - - - *Dicks. f.* 3. p. 11. t. 8. f. 6.
Houghton-moor. III. IV.

excisa - - - *Dicks. f.* 3. p. 11. t. 8. f. 7.
Woods at Beverley. IV.

pulcherrima - *Dicks. f.* 1. p. 7. *Dill. t.* 69. f. 3.
Hoffm. Germ. Fl. 83.

Heaths, at Harrowgate; and Hough-
ton-moor, where I once found it
in fructification. VIII.

Tomentella - *Hoffm. Germ. Fl.* 83.
This is the *J. ciliaris. Hudf.* and
in my former paper.

scalaris - - *With.* 870. *J. trichomanes. Dicks.*
f. 3. p. 10. t. 8. f. 5. *Dill. t.* 31.
M 2 f. 5.

f. 5. *Mnium trichomanes*. Linn.
Huds. and in my last paper.
Shady woods.

Jungermannia minuta - - - Dicks. f. 2. p. 13. Dill. t. 69. f. 2.
Woods, near Richmond, creeping
on some species of *Hypnum*.

viticulosa - - - Huds. 509. With. 873. Dill. t. 69. f. 7.
On stones, in rivulets, at Hornby-
Hills and Malham Cove.

multiflora? - - - Huds. 510. Dill. t. 69. f. 4.
Houghton-moor.
I have not found it in fructifi-
cation.

quinquedentata Linn. Huds. 509. With. 871. Dill.
t. 71. f. 23.
In moist shady woods. Dr. Richard-
son. R. Syn.

julacea - - - Huds. 516. With. 881. Dill. t. 73.
f. 38.
Rocks in the West Riding. Birm-
ham Rocks.

rupestris - - - Huds. 516. With. 882. Dill. t. 73.
f. 40.
Birmham Rocks.

alpina - - - Huds. 517. With. 882. Dill. t. 73.
f. 39. *Andreaea petrophila*.
Hoffm. Germ. Fl. 80.

On Ingleborough and Birmham
Rocks.

Junger-

- Jungermannia curvifolia* - - - *Dickf. f. 2. p. 15. t. 5. f. 7.*
Birmham Rocks.
- concinata* - - - *Lightf. 786. With. 881.*
Birmham Rocks.
- trichophylla* - - - *Hudf. 516. With. 882. Dill. t. 73.*
f. 37.
Heaths, near North Binley. Dr. Richardson.
- sinuata* - - - *With. 869. Dill. t. 74. f. 44.*
Sides of ditches, near Beverley.
Bell Bank, near Bingley. *Dill.*
Middleton Wood, near Leeds.
Mr. Wood, in *With. III. IV.*
- tomentosa* - - - *acaulis, frondibus ramofo-furcatis*
linearibus, obtusis, tomentosis.
Hoffm. Germ. Fl. 91.
On rocks, in the North and West
Ridings.
- bicornis* - - - *fronde pinnata, foliolis alternis, bi-*
cuspidatis; cuspidibus pollenife-
ris. Fl. Dan. t. 888.
On the Wolds, between Beverley
and Market-Weighton.
- Blasia pufilla* - - - - - *Hudf. 518. With. 886. Dill. t. 31.*
f. 7.
Near Halifax. Mr. Bolton.
- Targionia sphærocarpos* - - - *Dickf. f. 1. p. 8. Dill. t. 78. f. 17.*
In fallow fields, near Beverley.

X. XI.

Targionia.

- Targionia hypophylla* Hudf. 519. Dill. t. 78. f. 9. Eng. Bot. t. 287.
Near Keighley. Mr. Knowlton. Mossy
places in Yorkshire. Dr. Richardson.
- Riccia natans* - - Eng. Bot. 252. Hudf. 522. With. 887. Dill.
t. 78. f. 18.
In ditches, and ponds, near Beverley.
- fluitans* - - Eng. Bot. 251. Hudf. 522. Dill. t. 74. f. 47.
With the above species, about Beverley.
- Lichen albus* - - With. 2. *Byssus lactea*. Linn.
Trunks of trees. Decayed mosses.
- incanus* - - On the ground. Trunks of trees.
- cinereus* - - On rocks.
- antiquitatis* - On rocks, large stones, and walls.
- flavus* - - Trunks of trees, and walls.
- botryoides* - Bark of trees, and walls.
- hebraicus* - - }
pulicaris - - } *Sibth. Fl. Oxon.* 317.
Bark of trees.
- roseus* - - *Fl. Dan.*
Bark of trees.
- atro-albus* - *With.* 5. —
On rocks.
- immerfus* - - *Eng. Bot.* 193. *With.* 6. *Relb. Fl. Cant.*
1026.
On chalk-stones, upon the Wolds.
- sanguinarius* - *Eng. Bot.* 155. *With.* 6.
Trunks of trees, and rocks.

Lichen

- Lichen graniformis* - *Dickf. f. 1. p. 10.*
On old pales.
- æruginosus* - *Sibth. Fl. Oxon. n. 880.*
Trunks of trees, near Beverley. Rare.
- muscorum* - *Relb. Fl. Cant. n. 848. With. 7.*
Upon moss, on heaths, in the North Riding.
- confluens* - - *Dickf. f. 1. p. 9. With. 8.*
On rocks, and walls, in the West Riding.
- niger* - - - *With. 10.*
Rocks and old pales.
- fulco-ater* - - *With. 11.*
On walls, and stones, near Harrowgate.
- corneus* - - *With. 20. t. 31. f. 3.*
On the trunks of oaks, near Beverley.
- querneus* - - *Dickf. f. 1. p. 9. t. 2. f. 3.*
Trunks of oaks, in the East Riding.
- geographicus* - *Eng. Bot. 245. With. 12. Dill. t. 18. f. 5.*
Rocks, in the North and West Ridings.
- fulphureus* - *Dickf. f. 2. p. 17. With. 12.*
Rocks, and walls.
- atro-virens* - *With. 13.*
On rocks, near Harrowgate.
- rupicola* - - *With. 13.*
Limestone rocks, and stones, in the West Riding.
- vernalis* - - *With. 14. L. ferrugineus. Hudf. Dill. t. 18. f. 4.*
Bark of trees.

Lichen

Lichen *Bæomyces* - - *Eng. Bot.* 374. *L. ericetorum*, in my former paper.

On heaths.

ericetorum - *Eng. Bot.* 372. β . *Lightf.* *L. icmadophila*.

With. 15. *L. elveloides*. *Weber*.

On heaths. Houghton-moor.

flavo-rubescens *With.* 15. *L. aurantiacus*. *Lightf. Fl. Scot.*

810.

Bark of trees. Pales. Walls.

pertusus - - *With.* 15. *Huds.* 525. *Dill. t.* 18. *f.* 9.

Rocks, and trunks of trees.

ventosus - - *With.* 16.

Rocks, in the West Riding. Near Harrowgate.

sphærocephalus *Eng. Bot.* 414. *Dill. t.* 14. *f.* 3.

Trunks of trees, at Lonsdaleborough; shewn me by Mr. Knowlton.

corallinus - *With.* 16.

Rocks, in the North and West Ridings.

crenulatus - *Dicks. f.* 3. *p.* 15. *t.* 9. *f.* 1.

Rocks, in Yorkshire. *Dickson*.

candicans - *Dicks. f.* 3. *p.* 15. *t.* 9. *f.* 5.

Rocks, in Yorkshire. *Dickson*.

scruposus - - *Eng. Bot.* 266. *With.* 19. *Dill. t.* 18. *f.* 15. B.

On walls, dry banks, and heaths.

pulverulentus *Sibth. Oxon.* n. 893. *Dill. t.* 24. *f.* 71.

Trunks of trees.

tiliaceus - - *Dicks. f.* 3. *p.* 16. *Hoffm. Germ. Fl.* 149.

On trees, near Walkington.

Lichen

Lichen olivaceus - - var. *nitidus*. *Sibth. Oxon. Dill. t. 24. f. 78.*
Trunks of trees.

pulverulentus β . *Weber.*
Trunks of trees, near Beverley. Rare.

frustulosus - *Dicks. f. 3. p. 13. t. 8. f. 10. With. 19.*
Rocks, in Yorkshire. *Dickson.*

pallidus - - *With. 21.*
Trunks of trees. Old paling. Walls.

frigidus - - *With. 22.*
On moss, and heath, upon Houghton-
moor.

marmoreus - *With. 22.*
On the bark of trees, and on the bare
ground, covered with decayed moss,
in Yorkshire. *Withering.*

cerinus - - *Dicks. f. 3. p. 14. With. 24.*
On old paling, and trunks of trees.

byssinus - - *With. 25.*
Trunks of trees, and stones.

flavescens - - *Huds. 528. L. flavicans. With. 25. Dill.*
t. 18. f. 18. A. C.
On walls.

rimosus - - *Dicks. f. 1. p. 12. With. 25.*
Rocks, and stones, in Yorkshire. *Dicks.*

cæsius - - *Dicks. f. 2. p. 19. t. 6. f. 6.*
On stones, in the West Riding.

pruinatus - *Dicks. f. 3. p. 15. t. 9. f. 4. With. 20.*
On stones, in the mountainous parts of
the West Riding. Near Harrowgate.

90 Mr. TEESDALE's Supplement to the *Plantæ Eboracenses*.

- Lichen luridus* - - *Dickf. f. 2. p. 20. Dill. t. 30. f. 134.*
Rocks, in the North Riding. Rare.
- multifidus* - *Dickf. f. 3. p. 16. t. 9. f. 7.*
On stones, in the West Riding. Near Harrowgate.
- cartilagineus* - *With. 29. L. crassus. Hudf. 530. Dill. t. 24. f. 74.*
About Malham. *Hudf.* On rocks, near Harrowgate.
- muralis* - - *Dickf. f. 1. p. 11. With. 29.*
Rocks and walls. Not common in the North.
- albescens* - - *Hudf. 529.*
Trunks of trees.
- Pfora* - - - *With. 26.*
On stones. Rocks at Harrowgate.
- squamatus* - *Dickf. f. 2. p. 20. Dill. t. 30. f. 135.*
On a heath, at Harrowgate. Rare.
- centrifugus* - *Hudf. 530. With. 32. Dill. t. 24. f. 75.*
Rocks, in the West Riding.
- marginalis* - *Hudf. 534. With. 34. Dill. t. 19. f. 25.*
On walls, near Settle. Dr. Smith, in *Withering.*
- foliaceus* - - *With. 35. Hudf. edit. 1. L. alcicornis. Lightf. 872. Dill. t. 14. f. 12.*
Heaths. Houghton-moor.
- filiformis* - *Hudf. 552. With. 38. Dill. t. 14. f. 10.*
Roots of trees, in woods. Heaths. On walls.

Lichen

Lichen exiguus - - Hudf. 552. Dill. t. 14. f. 11. C. exilis.
Hoffm. Germ. Fl. 121.

On walls. Roots of trees. Heaths.

tuberculatus - Relb. Fl. Cant. 435. Dill. t. 14. f. 6.
C. K. L.

Cladonia tuberculosa. Hoff. Germ. Fl. 122.
Heaths.

Cladonia cristata. Hoffm. Germ. Fl. 124.
Dill. t. 14. f. 9.
Heaths.

Cladonia prolifera. Hoffm. Germ. Fl. 122.
Heaths. Roots of trees.

Cladonia marginalis. Hoffm. Germ. Fl. 123.
Dill. t. 14. f. 6. I. M.
Heaths. Walls.

Cladonia irregularis. Hoffm. Germ. Fl. 125.
Dill. t. 15. f. 20.
Roots of trees, and heaths.

Cladonia coronata. Hoffm. Germ. Fl. 25.
Dill. t. 15. f. 19. C.
Woods, and heaths.

radiatus - - With. 38. L. gracilis. Hudf. 555. Dill.
t. 15. f. 16.

Cladonia radiata. Hoffm. Germ. Fl. 120.
Barren heaths.

Cladonia Fibula. Hoffm. Germ. Fl. 127.
Dill. t. 15. f. 15.
Barren stony ground, and heaths.

Lichen paschalis - - *Huds.* 558. *Eng. Bot.* 282. *With.* 44. *Dill.*
t. 17. f. 33.

Rocks, in the West Riding.

fragilis - - *Huds.* 558. *Eng. Bot.* 114. *With.* 41. *Dill.*
t. 17. f. 34.

Rocks, in the North and West Ridings.
Near Harrowgate.

spinosus - - *Huds.* 556. *With.* 45. *Dill.* t. 16. f. 25.
On heaths. Houghton-moor. Harrow-
gate.

furcatus - - *Huds.* 556. *With.* 45. *Dill.* t. 16. f. 27.
Heaths. Dry banks. Earthen walls.

uncialis - - β . *Huds.* 555. *Dill.* t. 16. f. 21. B.
Cladonia biuncialis. *Hoffm. Germ. Fl.* 116.
Heaths. Houghton-moor.

Cladonia uncinata. *Hoffm. Germ. Fl.* 116.
Dill. t. 16. f. 21. A.

Heaths.

jubatus - - *Huds.* 561. *With.* 46. *Dill.* t. 12. f. 7.
Usnea jubata. *Hoffm. Germ. Fl.* 134.

On rocks, and trunks of old oaks, in the
North and West Ridings.

chalybeiformis *Linn.* *With.* 47. β . *jubatus.* *Huds.* 561.
Usnea chalybeiformis. *Hoffm. Germ. Fl.* 135.
Dill. t. 13. f. 10.

Rocks. Old paling. Trunks of trees, with
the last species.

Lichen lanatus - - *Huds.* 562. *With.* 47. *Dill. t.* 13. *f.* 8.
Rocks, in the West Riding. At Harrowgate.

prunastri - - *Dill. t.* 21. *f.* 55. B. G. I. *Lobaria populina.* *Hoffm. Germ. Fl.* 140.

On rocks, trees, and old pales, every where.
Lichenoides lacunofum lacerum, *latius et congestius.* *Dill. t.* 27. *f.* 57. A.B.C.D.
On black thorn. Rare.

tenellus - - *With.* 56. β . *ciliaris.* *Huds.* 538. *Dill. t.* 20. *f.* 46.

Branches of trees, particularly the black thorn.

læte-virens - *Lightf.* 852. *With.* 58. L. *herbaceus.*
Huds. 544. *Dill. t.* 25. *f.* 98.

In Yorkshire. *Hudson.*

plumbeus - - *Lightf.* 826. *With.* 60. L. *cærulescens.*
Huds. 531.

On rocks, in the North and West Ridings.
Near Bradford. *Hudson.*

concolor - - *Dicks. f.* 3. *p.* 18. *t.* 9. *f.* 8. *With.* 62.
Trunks of trees. Beverley. Lonsborough.

pustulatus - *Huds.* 549. *With.* 64. *Dill. t.* 30. *f.* 131.
Near Halifax. Bolton, in *Hudson.*

polyrhizos - *With.* 64. L. *velleus.* *Huds.* 550.
Ingleborough Hill. Rare.

polyphyllus - *Huds.* 551. *With.* 65. *Dill. t.* 30. *f.* 129.
Rocks, near Harrowgate.

Lichen

Lichen faccatus - - *Huds.* 548. *With.* 67. *Dill.* t. 30. f. 121.
On rocks, and dry banks, in many places,
in the North and West Ridings.

About the mouth of Yordas-cave, near
Ingleborough Hill. Dr. Smith, in
Withering. Near Beverley. Rare.

polydactylos - *With.* 69. γ . *caninus*. *Huds.* 547. *Dill.* t. 28.
f. 107.

Heaths. Roots of trees.

var. 2. *With.* δ . *caninus*. *Huds.* *Dill.* t. 28.
f. 108.

On Rumble's mear (moor) near Helwick.
Dill. and *Hudson*.

rufescens - - *With.* 70. β . *caninus*. *Huds.* *Dill.* t. 28.
f. 109.

Peltigera rufescens. *Hoffm. Germ. Fl.* 107.

Woods. Heaths. Roots of trees.

venosus - - *Huds.* 546. *With.* 69. *Dill.* t. 28. f. 109.

In rocky places, north of Helmsley. Rare.

aphtofus - - *Huds.* 547. *With.* 70. *Dill.* t. 28. f. 106.

Ingleborough Hill, and other parts of
the county. *Hudson*.

tremelloides - γ . *Lightf.* 842. *Dill.* t. 19. f. 34. *With.*
var. 3.

In mossy and stony pastures.

δ . *Lightf.* *Dill.* t. 19. f. 35. *With.* var. 4.

Among moss, in pastures, at Beverley.

cochleatus - - *Dicks.* f. 1. p. 13. t. 2. f. 9. *With.* 74.

Collema auriculatum. *Hoffm. Germ. Fl.* 98.

On

On large stones among moss, by the side
of a rivulet, north of Harrowgate.

In Yorkshire. Curtis, in *Withering*.

Lichen nigrescens - *Huds.* 537. *With.* 74. *L. vespertilis.* *Lightf.*
840. *Dill. t.* 19. *f.* 20.

Trunks of old trees, particularly the ash.
In stony places among moss. Rarely found
with *scutella*.

cristatus - - *Huds.* 535. *With.* 75. *Dill. t.* 19. *f.* 26.
In moist shady situations, among moss.

palmatus - - *With.* 74. *Dill. t.* 29. *f.* 30.
Among moss, in woods where there is
but little grass. Old gravel walks.

crispus - - *Huds.* 535. *With.* 76. *Dill. t.* 19. *f.* 23.
Shady situations, where the earth is but
thinly covered with grass, and moss.

fluviatilis - *Huds.* 536. *With.* 77. *Dill. t.* 19. *f.* 28.
On stones in the rivulet that issues from
Malham Cove. I have not found it
in fructification.

IX. *A Continuation of the History of Tipula Tritici, in a Letter to Thomas Marsham, Esq. Tr. L. S. by the Rev. William Kirby, F. L. S.*

Read February 5, 1799.

MY DEAR FRIEND,

Barham, December 1798.

AFTER all the pains we took last year to investigate the history of the Wheat Insect, we were obliged to leave it in some measure incomplete. This arose from our beginning our observations too late in the season, after the parent fly had disappeared. Determined to watch its progress this year from the first appearance of the ear, my success, in most respects, has been answerable to my expectations. I have not indeed yet been able to ascertain the male of our *Tipula*; but to make some amends for this disappointment, I have had an opportunity of observing all the motions of the female, and besides have discovered two new species of *Ichneumon*, which, in conjunction with that known before, and described in the last volume of the Linnean Society's Transactions^(a), under the name of *Ichneumon Tipulæ*, seem to be intrusted with the important office of restraining within due limits the numbers of that very destructive little animal.

Without further preface, I shall now proceed to connect and put into form the different memoranda which I have by me on this subject, having adhered faithfully to the Linnean maxim, *Nulla dies sine*

(a) Vol. iv. p. 232.

linea, and always taking my pencil and memorandum-book with me when I went into the fields to make my observations.

Previous to the season when the ear begins to emerge from the *folium vaginans* (b), I have, as opportunities of examining fir plantations occurred, been upon the watch for De Geer's *Tipula Pini* (c); but not being so successful as to meet with that insect, I cannot ascertain how nearly it may be related to its *congener* of the wheat. I was careful also, at the same time, to inspect the plants that were in blossom in the borders of the wheat fields, in hopes of finding (*copulâ connexos*) the two sexes of *Tipula Tritici*, but with no better success.

It is to be observed that I had usually chosen the forenoon for making my inquiries. It chanced that on the third of June last I had occasion to pass through a field planted with wheat, in the evening, and, to my great surprise and satisfaction, my attention was immediately arrested by an innumerable host of our *Tipulæ* flying about in all directions; and from that day to the latter end of the same month these insects were always to be met with in the wheat fields. They were seldom to be seen much before seven o'clock; at eight the field appeared to swarm with them, at which hour they were all busily engaged in laying their eggs; and about nine they generally disappeared: they were indeed so extremely numerous, that if each of them were to lay its eggs in a different floret, and those eggs were permitted to produce larvæ, I think, upon a moderate calculation, more than half of the grain would be destroyed. I have no-

(b) I was strongly tempted to introduce two or three new words into this Paper, viz. *evaginate* and *evagination*, to express without a periphrasis the emerging of the ear from the *folium vaginans*, and *oviposition* for the laying of eggs, from the Latin phrase *oviponere*; but lest this liberty should wear the appearance of affectation, I refrained from it.

(c) Linn. Transf. vol. iv. p. 228.

ticed twelve at one time depositing their eggs in the same ear. It is remarkable that amongst the myriads that I have seen of the female, I should not have observed one which I could take for the male: indeed, towards the latter end of the month, (24th,) I took two or three specimens, which, except that they had black bodies and were smaller, appeared exactly similar to our *Tipula*; but as neither their antennæ are hairy, nor their wings spotted, as was the case with the specimen you received from Mr. Markwick, they can scarcely be the male. Indeed the appearance of the male, instead of being later than that of the female, ought to be as early or earlier, in order that they may be in readiness to perform the work of impregnation previous to the season in which the females lay their eggs, which begins, at least it did this year, with the month of June. Hence I suppose that each sex is disclosed from the pupa in the genial month of May, when, to use the poetical language of Scopoli upon another occasion, "*nuptias instituunt, de loco in locum continuo volitantes, zephyro plaudente choreis (d).*"

Although these insects are so numerous in the evening, yet in the morning not a single one is to be seen upon the wing: they do not however then quit the field which is the scene of their employment; for, upon shaking the stalks of the wheat, or otherwise disturbing them, they will fly about near the ground in great numbers. I found their station of repose to be upon the lower part of the culm, with their heads upwards.

It is very entertaining to observe the method to which these insects have recourse in order to deposit their eggs in a situation where the larvæ may soon arrive at their food: when engaged in this employment they are not soon disturbed; which circumstance affords the observer an excellent opportunity of examination. As I hinted

(d) *Ent. Carniol.* n. 801, ubi de *Ape fabulosa*.

before,

before, a number may be seen at the same time upon one ear: they place themselves in such a position that their *anus* stands nearly at right angles with the margin of the glume of that floret which they mean to pierce. But how are they to introduce their eggs within the floret, for they deposit them between the exterior and interior valvules of the corolla? To look at them when they are not engaged in this employment, their *anus* appears to be furnished with no instrument adapted to so nice an operation; but upon pressure it exerts (*e*) a long retractile tube or *vagina* (*f*), which unsheaths an *aculeus* (*g*) (if I may so term it) as fine as a hair and very long. This *aculeus* it introduces into the floret, and there deposits its eggs, which it usually places upon the interior valvule of the corolla, just above the stigmata. After she has done laying her eggs, the insect withdraws her *aculeus* with great caution and deliberation: yet it sometimes happens that she is unable to effect this; in which case she is detained a prisoner until some enemy devour her. In this situation I have found them more than once in my morning walks. I was very desirous of seeing the eggs pass through the *vagina*, but my first attempts were unsuccessful: at length I was gratified with this pleasing spectacle. I gathered an ear upon which some of our *Tipulæ* were busy, and held it so as to let a sun beam fall upon one of them, examining its operations under the three glasses of a pocket microscope: I could then very distinctly perceive the eggs (*b*) passing one after another, like minute air bubbles; through the *vagina*, the *aculeus* being wholly inserted into the floret. I examined this process for full ten minutes, before the patient little animal disengaged itself; and at last it was through my violence that she discontinued her employment and flew away.

(*e*) For this sense of the word *exert*, see Johnson's Dict. Nos. iv. v.

(*f*) Tab. iv. fig. 2. a.

(*g*) Fig. 2. b.

(*b*) Fig. 2. c.

On the seventh of June, upon opening a floret, I discovered a small patch of eggs; they were oblong (i), transparent, and of a pale buff colour. I afterwards found several of these little patches, containing from a single egg only, to more than twenty. On the seventeenth I found, for the first time, a larva newly hatched: it adhered to the lower end of one of the anthers (k), and was perfectly transparent and colourless; from which circumstance I conjecture, that it had taken no food. I afterwards detected two more in a similar situation, one of which had become straw-coloured from the contrary cause. In another floret, upon the same day, I found many with their heads immersed in the woolly summit of the germen: some were in the interior valvule of the corolla; others appeared to be busy upon the plumose stigmata, upon which I did not observe that any pollen had been discharged from the anthers. Upon the twenty-second I observed that the larvæ were usually in the situation represented in the accurate drawing engraved in the third volume of the Linnean Society's Transactions (l). All circumstances considered, it seems to me most probable, that these animals do not feed upon the pollen before it is discharged from the anthers (m); yet one would think that in this case sufficient must escape them to fertilize the germen. How they prevent this I can but conjecture; as their heads are often immersed in the stigmata, and in the down observable upon the top of the germen, it is possible they may occasion an obstruction in those fine ducts through which the fertilizing principle passes down into the grain; or they may consume that spermatic moisture upon the stigma, without the aid of which the pollen cannot perform its office. On the twenty-ninth the parent *Tipulæ* had all disappeared, and soon after this period my investigations were stopped by illness;

(i) Tab. iv. fig. 2. d.

(k) Fig. 2. e.

(l) Tab. xxii. fig. 10.

(m) Except perhaps when they are newly hatched.

but

but as I had brought them down so far as to connect them with those made last year (*n*), this interruption was of less consequence.

Before I take leave of this part of my subject, and give some account of the *Ichneumons* mentioned above, I must observe that the female of *Tipula Tritici* approaches very near to the female of one described by Geoffroy (*o*), which Fourcroy and Villars after him have called *Tipula immaculata*. His definition of that insect, "*atralis niveis*," and his description in French, answer exactly to a minute black *Tipula*, which I find common upon the wheat, remarkable for its beautiful plumose antennæ (*p*). The female, he observes, is very different from the male, and it is necessary to have seen them copulating, not to make of it another species. It is short, thick, yellow, with black eyes (*q*). He speaks of his insect as common in gardens, a situation in which I have never found *Tipula Tritici*. This description certainly approaches very near to our female, yet the colour of that is deep orange, and not yellow: besides, he makes no mention of the beautiful prismatic hues which adorn the wings. The black male, mentioned above, disappears at the same time with our female of the wheat, but it agrees in no respect with the specimen you received from Mr. Markwick: besides, I found another black one, which appeared to me to be its female.

I shall now proceed to give you some further account of the insects which prey upon *Tipula Tritici*. I have reason to believe, as I

(*n*) Linn. *Transf.* iv. p. 239.

(*o*) *Hist. ab. des Inf.* ii. p. 567. n. 26.

(*p*) Le mâle de cette petite espèce est allongé comme les précédens, avec le ventre mince et en filet. Sa couleur est partout d'un noir matte. Ses antennes forment de beaux plumets. Ses aîles sont d'un blanc laiteux, qui se fait d'autant plus remarquer, que son corps est fort noir.

(*q*) La femelle est très différente, & il faut les avoir vû accouplés ensemble pour n'en pas faire une autre espèce. Elle est courte, grosse, de couleur jaune, avec les yeux noirs. On trouve cette Tipule partout dans les bosquets des jardins.

hinted before, that there are not less than three *Ichneumons* attached to it. If Providence for wise ends has created so destructive an insect, it has been no less attentive to prevent it from becoming too numerous, by making it the food of so many other insects.

Upon the seventh of June I observed a very minute *Ichneumon* exceedingly busy upon the ears of wheat, which at first I took for *Ichneumon Tipulae* (r); but upon a closer examination I found it to be a species entirely distinct (s), as will appear when I come to describe it. As soon as I was convinced of this, and observed that it pierced the florets at a time when no larvæ had made their appearance, I conjectured that it must lay its eggs in the eggs of the *Tipula*. How far this conjecture was well or ill founded must be determined by future observations, as I do not think I have collected facts sufficient to decide the question. This insect is furnished with an *aculeus* three or four times its own length (t), which is finer than a hair and nearly as flexile: this is commonly concealed within the abdomen, but when the animal is engaged in laying its eggs it is exerted: one day it gave me a full opportunity of examining this process. It inserts its *aculeus* between the valvules of the corolla near the top of the floret; its antennæ are then nearly doubled and motionless, its thorax is elevated, and its head and abdomen depressed: the latter, when it withdraws the *aculeus*, is moved frequently from side to side before it can extricate it. This insect has allowed me to examine its operations under a lens for six or seven minutes: upon opening the floret into which it had introduced its *aculeus*, I could find neither egg nor larva of the *Tipula*; but, upon examining it very closely under three glasses, I discovered, scattered over one of the valvules of the corolla, a number of globular eggs,

(r) *Linn. Transf.* iv. p. 226. Tab. iv. fig. 8.

(s) Fig. 4.

(t) Fig. 5. a.

extremely minute (v), evidently not those of that insect. It is possible that there were in this floret eggs of the latter, which might be destroyed upon opening it, or escape my observation. At other times I have found eggs of *Tipula Tritici*, and once some larvæ, in florets upon which I had observed this *Ichneumon* busy. If we reason from analogy, and the general habits of the genus *Ichneumon*, the eggs of this insect ought to be deposited in some other insect in one of its states; but, in the instance above mentioned, it seems only to have been attentive to scatter them in such a situation as might lead them when hatched to their proper food. From the time in which it first makes its appearance, ten days before the hatching of the first larvæ, I am inclined to adopt my original conjecture, that the eggs are its prey; and yet there seems not to be a sufficient disproportion between the size of the one and the other for this purpose; at least it must take more than one to nourish a larva of the *Ichneumon* to its proper size. Where we are not in possession of sufficient instances to establish any fact beyond doubt, it would be great presumption to be too positive; I shall not therefore pretend to decide in which of its states our fly furnishes food to the offspring of this *Ichneumon*. I think we may with more confidence affirm, that it is attached to *Tipula Tritici* in one of them. The circumstance of its depositing its eggs within the florets of the wheat, in the very situation chosen by that insect for the same purpose, and usually where either its eggs or larvæ were concealed, sufficiently establishes this point; unless we may suppose it to prey upon *Thrips Physapus*. This latter insect, however, to the best of my recollection, I did not find in any of those florets which I examined after seeing this *Ichneumon* insert its *aculeus* into them. It is probable that its appearance is later, as there is no mention of it in my memoranda of this year.

(v) Tab. iv. fig. 5. b.

On

On the twenty-second of June I observed another *Ichneumon* (w), not uncommon, piercing the florets of the wheat. This species did not appear to insert its *aculeus* between the valvules of the corolla, but to pierce the glumes of the calyx; to effect which purpose it is armed with a very short one sub-exserted: of this I found both the sexes; the male was distinguished from the female by its large eyes, placed very near each other, with reticulations unusually visible. I presume this to lay its eggs in the larvæ, but have not been able positively to ascertain the fact. Upon the same day that I first observed this species, our *Ichneumon Tipulæ* made its appearance in great numbers; a strong proof that the larvæ were now generally hatched. Concerning this *Ichneumon* I have no new remarks to offer, except that it must introduce itself within the floret to come at the larvæ, as appears from its mode of laying its eggs (x): so that these three enemies of the *Tipula* have each a different method of attacking it. The first undermines its little fortrefs, the second makes a breach in the walls, and the third carries it by storm (y).

Amongst the insects of other genera that I particularly noticed upon the wheat this season, the *Aphis granaria* (z) was common; as was likewise a species of *Cimex* in all its states, but I could not perceive that it devoured our *Tipula*. It answers in some respects to *C. lateralis* of Fabricius (a), but in others it differs much from it: I shall add a description of it to the others at the end of this letter.

(w) Tab. iv. fig. 10.

(x) Linn. Transf. vol. iii. p. 243. and vol. iv. p. 236.

(y) On the fourth of July I saw another *Ichneumon* inserting its *aculeus* into a floret of wheat, but it evaded my endeavours to take it. It seemed much too large to have any connection with our *Tipula*.

(z) Linn. Transf. vol. iv. p. 238, note *.

(a) Fabr. Sp. Inf. 2. p. 372. n. 209. Linn. Syst. Nat. ed. Gmel. p. 2190. n. 517.

Several

Several species of the genus *Empis* also frequented the wheat fields, often carrying off our *Tipula* in their diminutive beaks.

I have now given you as complete an account of these insects as the observations of the present year enable me. Something still remains to be done; for instance, to ascertain the male, the hybernacula of the pupa, to collect further facts relative to the two new *Ichneumons*, and, from observations taken in successive years, to determine how far our crops of this grain depend upon the increase or decrease of the *Tipula* and its *Ichneumons*.

Cui bono? is a query often put to naturalists; and the agriculturist perhaps will ask upon the present occasion, Can you inform us how we may prevent or diminish the ravages of these insects? In reply to this, I would observe, that the first step towards curing a disorder, is to find out its cause. In the present instance this is the business of the naturalist, and this is done. The intelligent farmer has no longer to ask what occasions the mischief; all he has now to do, is to aim at discovering a remedy. By a set of experiments first made upon a small scale, he may possibly find out some method that will prevent this insect from laying its eggs in his wheat: these should commence as soon as the ear begins to quit the *folium vaginans* or hose; and they ought to be continued till the germen is impregnated, or, to use the rural phrase, the wheat is off the blossom. Perhaps fumigations of tobacco or sulphur, if made when the wind was favourable, might render the ear disagreeable to this insect. Much of the injury which this fly does, in years peculiarly favourable to its increase, it is possible, by some such means might be prevented; yet it is not certain that the total annihilation of it would be ultimately beneficial (b). But be it granted that our labours lead the

(b) We are very apt to think, that if certain noxious species of animals could be annihilated, it would be a great benefit to the human race; an idea that arises only from our

the way to no discovery of this kind, may it be said that we have been idly busy and unprofitably laborious, when we have succeeded in developing some of the most curious mysteries of nature, and in laying open the history of some of those secondary causes, which, guided by the hand of Providence, produce scarcity or plenty as the one or the other preponderate?

As I made my description of *Tipula Tritici* last year from a single specimen, and that produced before its time, it will hardly be deemed tautology if I draw out a new one; more especially as an error with respect to the colour of its wings, much calculated to mislead an examiner, has crept into it. In my MS. I find it "*alis albidis*," but I see it is printed "*alis hyalinis*," an expression which completely misrepresents their colour. As two new species of *Ichneumon* are to be described, it may also not be amiss to work over again the description of *Ichneumon Tipulæ* with a view to them.

TIPULA *Tritici*.

T. rufo-fulva; oculis nigris; alis lacteo-iricoloribus margine pilosis.

Fœmina (c).

Tota rufo-fulva; thorax intensius, pedes autem dilutius. *Antennæ* corpore sublongiores, duodecim-articulatæ articulis pedicellatis

short-sightedness, and our ignorance of the other parts of the great plan of Providence. We see and feel the mischief occasioned by such creatures, but are not aware of the good ends answered by them, which probably very much exceed it. I have heard of farmers, who, after having taken great pains to destroy the rooks from their farms, upon being successful, have suffered infinitely more in their crops, from the great increase of the larvæ of insects, before kept under by these birds, than they ever did from the rooks themselves. The same might be the case, could we annihilate the *Tipula* of the wheat; for every link of the great chain of creation is so closely connected on each side with others, and all parts so combine into one whole, that it seems not easy to calculate the consequences that would arise from the entire removal of the most insignificant, if any can be deemed such, from the system.

(c) Tab. iv. fig. 1.

oblongis

oblongis medio constrictis (*d*), pilosulæ, nigricantes. Oculi nigri suprà conniventes. Alæ corpore longiores, amplæ, apice rotundatæ; margine omni, sed interiori præcipuè, piloso; lacteæ coloribus prismaticis pro situ variè micantes. Abdomen vaginâ instructum retractili aculeum longissimum filiformem exferente.

Longitudo corporis (vaginâ exclusâ) lin. 1.

Tritici spicas primâ æstate vesperi circumvolitat, intra flosculos aculeum ani inferens, ova inibi positura post quatuordecim dies larvæ exclusæ polline antherarum vel nectare stigmatum vescuntur granum exinantes (*e*).

ICHNEUMON. *Minuti, abdomine ovato sessili.*

1. *inferens*. I. ater; antennis capitatis; abdomine lanceolato nitido (*f*).

Corpus atrum. Antennæ fractæ capitatæ. Caput et thorax subobscuri. Alæ hyalinæ aveniæ corpore longiores; superiores lineolâ nigrâ, a basi versus medium ductâ, puncto rotundo desinenti, notatæ. Abdomen lanceolatum, aterrimum, nitidissimum, valde acutum, aculeum longissimum flexilem exferens. Pedes nigrescentes femoribus atris subclavatis.

Longitudo corporis infra lineam.

Præcedenti æqualis et hostis; horis diurnis circa spicas triticeas volans. In cujus flosculis, aculeo inserto, ovis *Tipulæ Tritici*, uti suspicor, ovula sua committit.

(*d*) Tab. iv. fig. 3. The singular form and mode of insertion of the joints of the antennæ are not to be seen, but under a powerful magnifier.

(*e*) Qu. Does Linnæus's *Ichneumon fecalis* (Syst. Nat. Gmel. p. 2714. n. 70) belong to the larva of a *Tipula*?

(*f*) Fig. 4.

The antennæ of this very minute insect are exceedingly singular (*g*). The first joint is long, rigid, and clavate (*b*); examined in a certain direction obcordato-bifid at the apex; this division serves as a socket for the next joint to act in (*i*), which is connected with it by means of a strong membrane or muscle (*k*), and performs the part of a ball or pivot: the four next joints are perfectly globular (*l*), and extremely minute: the clava, unless under a very powerful magnifier, appears solid; but, in that case, it is plainly discerned to consist of four articulations very closely set together (*m*).

2. *Tipulæ*. I. *niger*; antennis basi pedibusque rufis; tibiis posticis clavatis apice nigris; abdomine obovato (*n*).

Corpus nigrum. *Antennæ* fractæ vibratoriæ, thorace longiores, rufæ articulis quatuor ultimis majoribus nigris. *Caput et thorax* subobscuri. *Alæ* æviariæ immaculatæ, corpore longiores. *Abdomen* obovatum, nitidissimum, subdepressum, subseffile. *Pedes* rufi s. rufo-testacei, tibiis clavatis, posticis apice nigris.

Longitudo corporis infra lineam.

Tipulæ Tritici larvis contemporaneus, infestus, quibus concredit ovula sua, ovum unicum deponens singulis.

The antennæ of this insect, as well as every other part, are extremely different from those of the last. They consist first of a very long joint rather flexuous (*o*); from this to the four last joints, under a powerful magnifier, we could discover no articulations (*p*), and yet from the mode in which this part of the antennæ appears sometimes to be bent, I cannot help suspecting that there are some,

(*g*) Tab. iv. fig. 6, 7.

(*b*) Fig. 7. a.

(*i*) c.

(*k*) b.

(*l*) d.

(*m*) Fig. 7. c.

(*n*) Fig. 8.

(*o*) Fig. 9. a.

(*p*) Fig. 9. b.

although

although extremely minute. The four last joints are black, very distinct, and much larger than the rest (*q*).

3. *penetrans*. I. nigro-æneus; abdomine atro-cærulefcente, compresso; ano truncato, aculeo sub-exserto (*r*).

Corpus nigro-æneum, nitidum. *Antennæ* nigrae, clavatae, thorace breviores, acutae. *Alæ* aveniæ, hyalinae; superiores lineolâ mediâ marginis crassioris nigra demum in discum obliquè incurrente, et puncto rotundo desinenti. *Abdomen* atro-cærulefscens, sub-compressum, ano truncato, aculeo sub-exserto.

Longitudo corporis infra lineam.

Triticum frequentat simul cum præcedenti, glumas aculeo brevi penetrans ovula positurus. Maris oculi majores, pallidiores, approximati.

The clava of the antennæ of this little insect consists of four joints set close together (*s*); the last is the largest, and acute. We could not with certainty determine whether its footstalk was jointed or not.

I owe the drawings of the antennæ of the three last insects to the accurate eye and pencil of the Rev. Peter Lathbury, of Woodbridge, F. L. S. a most ingenious and intelligent naturalist. These *Ichneumons* (*t*) may be placed after *Ichneumon secalis* of Linnæus, and *Tipula Tritici* after *Tipula Pini* of De Geer.

(*q*) Tab. iv. fig. 9. c.

(*r*) Fig. 10.

(*s*) Fig. 11. a.

(*t*) The remarkable variations in the form of the antennæ in these three species, undoubtedly of one genus, sufficiently prove that Geoffroy was wrong in separating his genus *Eulophus*, &c. from *Ichneumon* merely on account of that circumstance. *Hist. ab. des Inf.* ii. p. 312. pl. xv. fig. 3.

I shall

I shall now, as I promised above, proceed to describe the *Cimex* which I found so common upon the wheat in all its states.

CIMEX. *Oblongi, antennis setaceis longitudine corporis.*

Tritici. *C. angustus, niger; thoracis lateribus, coleoptrorum limbo, femoribusque pallidis.*

Corpus valde angustum, nigrum. *Rostrum* thoracis longitudine, pallidum. *Antennæ* obscurè rufæ articulo primo majore pubescenti, nigro. *Caput*, fronte acuta, posticè pallidum, lineâ intermediâ longitudinali exaratum. *Oculi* prominuli. *Thorax* anticè angustior, lateribus lineolisque tribus intermediis posticis, pallidis. *Scutellum* nigrum lineâ intermediâ elevatiusculâ. *Elytra* nigricantia margine exteriori latè pallida, pallore paululùm virenti. *Alæ* hyalinæ iricolores. *Pedes* lividi, tibiis tarsisque posticis nigris.

Longitudo corporis lin. 4.

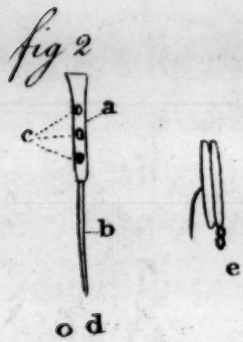
Habitant in *Tritici* culmis et spicis, *Larva, Pupa, Imago.*

So much for this year's observations upon *Tipula Tritici*.

Believe me, &c. &c.

EXPLA-





EXPLANATION OF TAB. IV.

FIG. 1. *Tipula Tritici* magnified, with its *Vagina* and *Aculeus*.

2. (a) The *Vagina*. (b) The *Aculeus*. (c) The Eggs passing through the *Vagina*. (d) A patch of Eggs. (e) A *Larva* newly hatched, and adhering to the lower end of one of the *Anthems*.

3. A portion of one of the *Antennæ* greatly magnified to shew the form of its joints.

4. *Ichneumon inferens* magnified.

5. *Abdomen* of ditto. (a) *Aculeus* exerted, long and flexile.

6. The *Antenna* of ditto.

7. A different view of the *Antenna*.

(a) The first joint, long, rigid and clavate, obcordato-bifid at the apex.

(b) The membrane that connects the second joint with it.

(c) The second joint, which acts the part of a ball or pivot.

(d) The four following joints, globular and extremely minute.

(e) The *Clava* of four joints set closely together.

8. *Ichneumon Tipulæ* magnified.

9. The *Antenna* of ditto.

(a) The first joint, very long.

(b) The space from the first to the four last joints, not visibly articulate, but I suspect it to be so.

(c) The four last joints, black, and larger than the rest.

10. *Ichneumon penetrans* magnified.

11. The *Antenna* of ditto.

(a) The *Clava* of four joints set close together, the last the largest and acute.

X. *Observations upon certain Fungi, which are Parasitics of the Wheat.*
By the Rev. William Kirby, F. L. S.

Read February 5, 1799.

DURING the time that my attention has been directed to those insects which frequent the wheat fields, I have often had occasion to observe the appearances produced in that grain by several different species of *Fungi* (*a*), which derive their nourishment from it. I thought of considering this subject at large; but as my time is likely to be fully employed in other pursuits, I see no probability of doing this in the manner that I could wish; and therefore having made some observations, which, though by no means complete, may not be wholly unimportant, I now beg leave to lay them before the Linnean Society, trusting that they may serve as hints to others who may be inclined to enter more fully upon so interesting a subject.

I have noticed five or six different species of these *Fungi*. The first I shall mention is named by Dr. Withering *Reticularia segetum* (*b*). In the Rev. Henry Bryant's pamphlet upon *Brand* (*c*), it is called

(*a*) That these appearances are produced by minute vegetables of the order of *Fungi*, seems now to be acknowledged by those naturalists who are the most conversant with that order.

(*b*) Bot. Arr. vol. iv. p. 388.

(*c*) A particular Enquiry into the Causes of that Disease in the Wheat commonly called Brand, &c. Norwich 1783.

Dust.

Dust Brand (d). Here its usual name is *Smut* or *Burnt Corn*. This species is common to wheat, oats, barley, and rye. I have also seen *Festuca fluitans*, and some other grasses, affected by it. It is scentless, and consumes not only the farinaceous part of the grain, but even the arillus and chaff, dispersing itself entirely before the corn is cut; so that the injury which it occasions is confined to the quantity of grain destroyed by it, which is not very great in any season. I have seen, more than once, half an ear of corn affected by this *Fungus*, when the other half was sound and good. Sometimes it injures all the stems that spring from the same root; at other times part of them escape: I never could discover any diseased appearance about the root. The ear is often affected by this *Reticularia* before it emerges from the *folium vaginans*, or *hose*.

Barley and oats are more frequently attacked by it than wheat; but this may be accounted for by the latter being usually *dressed* for sowing. Mr. Lathbury examined the dust of this *Fungus* under a powerful magnifier, and found that it consisted of a number of minute particles, uniform in shape and size, much smaller and blacker than those of the *Pepper Brand*, and less easily separable: they seemed to be contained in little irregular cells. This dust or seed is the food of a small, shining, black *Dermestes (e)*.

The next species that I shall mention is what Mr. Bryant distinguishes by the name of *Pepper Brand (f)*; with our farmers it is simply called *Brand* or *Bladders*. This species does not eat through the arillus, consuming only the farinaceous part of the grain. The ears affected by it are easily discovered by their external aspect; for the chaff opens, as if unnaturally distended (g), the germen becomes shorter and rounder, and exhibits the appearance both of swelling

(d) Bryant, p. 31. 54—56.

(e) *Dermestes ater*. Marsham.

(f) Bryant, p. 32.

(g) Bryant, p. 43.

and (if it may be allowable to apply such a term to it) inflammation; for, instead of the pale, pleasant green which is the colour of this grain in a healthy state, it assumes one of a deep and dingy hue: in this state it easily breaks when rubbed; and the sooty powder, that soils the fingers, emits a very fetid scent, extremely similar to that of putrid fish or *Chenopodium Vulvaria*. These circumstances sufficiently distinguish it from *Reticularia segetum*, and render it, when at all plentiful, exceedingly prejudicial to the farmer; for, as it does not eat its way through the arillus, and disperse itself before the corn is cut, it is carried with it into the barn, and, being broken under the flail, when the wheat is threshed, discolours and otherwise injures the sample, to such a degree as to render it unsaleable, or at least greatly to reduce its price. To prevent this evil, farmers generally dress their seed wheat with various preparations: some use a lixivium of wood ashes and urine; others, salt and water only, or sea water if at hand; others, the lie from the soap-boilers; others, again, urine and cheese whey; and I have heard of some who have infused arsenic for this purpose. All, I believe, dry their seed with fresh flaked lime. This custom, which is nearly universal, at least in these eastern counties, proves the idea to be general, that the disorder originates from the adhesion of the dust or seed of the Brand to the seed of the wheat, and that by these methods it is either washed off or destroyed: but what kind of substance it is, whether animal, vegetable, or merely a distemper incident to this grain, agriculturists do not trouble themselves much to inquire: this indeed is properly the business of the naturalist; and of these latter the opinions concerning it are various. Mr. Bryant, in the pamphlet referred to above, is strenuous for its being occasioned by an injury which he supposes the *antheræ* receive, by too great constriction, when the ear emerges from the *folium vaginans* (b); and therefore he scouts

(b) Bryant, p. 50—53.

the common practice just mentioned of dressing the seed, as answering no good end, and destructive of the grain (*i*). Some take the dust for the eggs of insects, and others adopt, what to me appears the most probable opinion, that this evil is occasioned by a minute vegetable of the order of *Fungi*.

Mr. Bryant founds his hypothesis upon few experiments, and those not very precisely stated (*k*): the one was favourable rather than otherwise to the practice which he is endeavouring to set aside (*l*). This was made upon a small scale in his garden. From his larger experiment no fair consequences in support of either side of the question can be drawn; for it was made in two separate fields, the corn being sown unprepared in one, and dressed as usual in the other (*m*). Whether these fields were near to each other, or far asunder, or of a similar or different soil, he does not inform us. The result of this experiment was rather in favour (not much he confesses) (*n*) of the undressed seed. Now, as some years are much more favourable to the production of Brand, it is probable, than others (*o*), and it is not to be expected that any precaution should so infallibly secure our crops as that they shall never be injured, no sound reasoner would venture to build a system upon experiments, much more numerous and decisive than those related by Mr. Bryant, which were made in a single year. Again, as some soils may be more given to the production of this disease, or whatever we are

(*i*) In justice to this gentleman, I must acknowledge, that, with respect to this circumstance, his opinion seems founded upon fact; for I am informed by intelligent farmers, that much of the grain *does* perish, as they suspect, by the use of lime. But is the evil incurred, greater than the evil prevented?

(*k*) Bryant, p. 24, 25. (*l*) Id. p. 32, 33. (*m*) Id. p. 24, 25. (*n*) Id. p. 33.

(*o*) A tenant of mine, in the year 1797 I think, told me that his wheat that year was very much injured by the Brand, although he prepared it in the same manner as he had done for ten years before, and always till then with success.

to call it, than others, nothing satisfactory can be deduced from such experiments as are tried in different fields, where the soil, aspect, or mode of cultivation and management, might be different. Mr. Bryant's method of accounting for this disorder is certainly ingenious, but founded upon no arguments which can convince one who is in search not of theories but of truth. That the practice of dressing the seed previous to sowing, in the way above mentioned, is a very effectual preventive of the Brand, will appear sufficiently evident, when I proceed to lay before the Linnean Society the result of some experiments made by my ingenious and accurate friend the Rev. Peter Lathbury, F. L. S. Upon my informing him that I was going to put together a few observations upon the subject, he very obligingly allowed me the use of his memorandum-book, which also related another very decisive experiment, upon a large scale, made by a gentleman of his acquaintance. It was in consequence of reading Mr. Bryant's treatise that Mr. Lathbury and this gentleman made their experiments. To these I shall add a few instances, out of many, that have fallen within my own knowledge.

Mr. Lathbury procured two small parcels of wheat, one from a clean sample not at all infected by the Brand, and the other from one which it had much injured. Each parcel he divided into four equal portions, and prepared for sowing as follows, dressing one portion from each parcel in the same manner. The first he washed carefully with spring water, and wiped with a soft dry cloth. The next he dipped in strong white wine vinegar, and allowed to dry upon a sheet of writing paper. A third he covered with salt water taken from the river; and after letting it remain in it for twelve hours, he wiped it as the first. The fourth portions were not dressed at all. The wheat from the clean sample was planted on one side of his garden, and that from the branded one on another. When he
sowed

sowed the two undressed portions, before he covered the seed with earth he sprinkled upon it some Brand dust. The result of his experiment was, that the three first portions of both sorts which had been prepared for sowing were very little injured by the Brand. Those which were from seed of the clean sample had only one ear affected, and that partially. Those from the branded sample produced two ears that were partially branded, and three that were affected by the Smut or Dust Brand (*Reticularia segetum*). But the produce of those portions which had been sprinkled with the dust of the Pepper Brand was greatly injured by it, three-fourths of the grain being destroyed. There appeared no difference in the number of plants produced from each portion of the clean seed; every grain vegetated, except in one instance, where it was evident that those which perished were destroyed by an insect: but the number of plants produced from the injured seed was various; that which was washed with water produced the greatest number, and that wetted with vinegar the smallest. Mr. Lathbury, in the dressing of the seed for his experiment, does not appear to have used lime; which I should apprehend to be the most efficacious preventive of the evil, though at the same time it may probably be most destructive of the seed. These portions of wheat were sown at Orford on the 20th of September 1786.

The other experiment was made in the neighbourhood of Woodbridge in the following year. I shall give it in Mr. Lathbury's words: "Mr. John Woolnough of Boyton, a most intelligent and excellent farmer, read Mr. Bryant's pamphlet, and, in consequence of his arguments, the next year sowed a large field in alternate breadths with wheat taken from a good sample (*without dressing*) and wheat that had been dressed in the usual manner. Long before the corn was ripe, the difference was most distinguishable. Upon those

those *stretches* (*p*) sown with dressed wheat it was difficult to find any branded ears, except upon the edges, where it is probable the undressed had been occasionally thrown in sowing it by hand. The other breadths were so branded as to make it necessary for him to determine to carry the corn at separate times to different places. A wet season setting in, the hurry of business made him neglect this precaution; and being all housed together, the whole crop, when threshed out, was spoiled so much by the Brand dust as to render the sample unsaleable. He computed his loss at 50l." I shall now copy an instance from Mr. Lathbury's memorandum-book, of mischief incurred by a defect in the quality of the lime used for drying the seed: "Mr. Howlett of Blighborough Lodge, always accustomed to dress his wheat with salt water and fresh flaked lime, was induced, from the magnitude of his concern, to purchase a quantity of lime which from some circumstances was offered to him at a much less price than usual. When he dressed his wheat with it, it was *air-flaked*, but did not appear otherwise altered by keeping; yet had it so far lost its strength, that his crop that year was injured by the Pepper Brand to the amount of upwards of 300l. in the opinion of good and able judges." Thus far Mr. Lathbury's communications.

I shall now proceed, as I proposed, in the next place to mention some instances which fell within my own knowledge. Last year an intelligent farmer informed me, that through haste he had neglected to dress part of his seed wheat, and that in consequence of it the crop of the field where it was sown was greatly injured by the Brand, while the rest of his wheat was free from it. He also informed me, that if old wheat was used for seed, it was not subject to it. During

(*p*) I know not the orthography of this word. It is usually pronounced *stretches*. It is the name given to those breadths, narrower or wider according to the nature of the soil, into which a field is divided previous to sowing.

the present year, a gentleman who occupies a considerable tract of land in the parish of Barham, and who is very attentive to farming, told me, that in a particular field, the dressed seed not holding out, they sowed the headland with what was undressed. The consequence was, that this part was very full of the Pepper Brand, while the rest of the field escaped. Another gentleman, who was brought up in the medical line, but has now taken to farming, assures me, that since he has dressed his wheat he has never suffered from this evil; and so convinced is he of the efficacy of the common method, that he is determined to prepare barley and oats in the same way, in order to prevent the *Dust* Brand. I could multiply more instances, if necessary, from information received from other quarters; but I think these are fully sufficient to prove that Mr. Bryant's hypothesis is not founded upon facts. It seems evident from them, that the mischief is carried with the seed into the field (*q*), and that the usual mode of dressing it acts as a sufficient preventive. From one of Mr. Lath-

(*q*) It may be objected here, that seed wheat is always taken from a clean sample, and that therefore it is most probable that it should meet with the seeds of the Brand in the soil; but in that case how could the previous dressing, especially a single washing, act as a preventive? Old seed, we see, is not subject to it; which must, I should think, arise either from the Brand Dust being rubbed off by the frequent friction of the grains one against another, when turned over, or from the latter losing its vegetative principle: but neither of these circumstances would hinder its attack, if the Brand Dust were already in the soil. Besides, its remaining within the grain, and not like the *Dust Brand* eating through the arillus, militates strongly against such a supposition. It is probable that in every wheat field a few scattered ears may be branded, and these would be sufficient to infect a large parcel of grain; for every diseased kernel contains millions of seeds of the Brand, and the frequent turning over and mixing of the corn would disseminate these through a considerable quantity. Still I would not be understood to assert, that Brand left in the soil never attacks the wheat: such a circumstance may account for its prevalence in some seasons, even where corn has been dressed: all I contend for is, that this is not usually the case.

bury's-

bury's experiments it appears, that the simple washing of the seed with water, if it be carefully wiped, answers all the end of steeping in a more expensive preparation. This perhaps could not be done with sufficient care and accuracy upon a large scale, otherwise the most simple and least expensive method is certainly the best, and all that seems to be wanted previous to sowing is thoroughly to cleanse the seed from the Brand dust that adheres to it. Probably wetting the seed with water, and afterwards drying it with fresh flaked lime, would answer every purpose.

The supposition that the Brand is produced by insects is not supported by one fact or experiment that I have ever heard of: indeed, the single circumstance that the disorder originates with the seed, and from thence passes by some unknown channel into the plant, entirely overturns it. I shall not therefore lose time by dwelling upon it, but proceed further to establish the third opinion, that the disorder is occasioned by a vegetable substance. The fact established by the above experiments, that the dust of Brand, carried into the field with the seed wheat, like other vegetables propagates itself, gives the highest degree of probability to this opinion; which is still further confirmed by the result of Mr. Lathbury's experiment of sowing it as it were upon its native soil (especially in the case of wheat taken from a clean sample), which seems to have occasioned the destruction of three-fourths of its produce. This is as decisive a proof as can be desired of its being a vegetable. But what I think places the matter beyond all doubt, is that this dust, when put under a powerful magnifier, exhibits every appearance of minute feed. I happened to take some dust from branded grains, I think last year, which I laid by for future inspection. After I had begun this Paper, I strewed some of that dust upon a piece of glass; and putting it under a very strong magnifier over a reflector, I was highly gratified

fied with observing that every particle of Brand was a globular seed; not the least variation in shape or magnitude was visible amongst them. I afterwards put a drop of water upon them, and let them remain in this situation for some time; but it produced no alteration whatsoever in their appearance. I afterwards examined in the same way the dust of one of the stellated *Lycoperdons* which I happened to have by me; but the particles of this were much smaller than those of the Brand, and not of a form so visibly determinate. Mr. Lathbury also tried a variety of experiments with the same view; and in every one "the dust when diluted with water instantly separated, and presented to the eye invariably a number of globules, touching each other, alike in form and size."

It now remains for consideration, how these feeds vegetate and ascend from the seed with the growing plant till they reach the heart of the grain. This is an inquiry that may be extended to a great number of the *Fungi*, which without impropriety may be denominated *subcutaneous* vegetables; for instance, the several species of *Æcidium* (for they are numerous), *Uredo* (r), and not a few *Sphæriæ*, except that these latter grow upon decaying substances: but these I shall let alone, and only offer a conjecture, for it is merely such, with respect to the Brand. Perhaps then the uncommonly minute feeds of this *Fungus* may attach themselves either to the *plumula*, and so pass through the air vessels into the plant; or else to the *rostellum*, which to me seems most probable; and in that case they may be propelled through the sap vessels with the sap, till at length they arrive at their final seat, the heart of the germen. Whether this species belong to the genus *Reticularia* or not, I must leave to be determined by those gentlemen who are more deeply skilled in "*cryptogamic lore*" than I am.

(r) Are *Æcidium* and *Uredo* sufficiently distinct?

The next *Fungus* of the wheat that I shall notice, is that *Æcidium* known to agriculturists by the name of the *Red Gum*. This species grows usually upon the inside of the glumes of the calyx and of the exterior valvule of the corolla, under their *epidermis*; which, when the plant is ripe, bursts, and emits a powder of a bright orange colour. This little plant, which is now well known (s), does not appear to be materially injurious to the grain, if at all. I have seen ears full of it, with very plump kernels. I have also found it upon branded ears. Before the cuticle which covers the seed of this *Fungus* bursts, it has very much the appearance of a small pustule upon the human body.

- 4 Another plant of this order, which is very common upon wheat, is that named by Mr. Lambert in the Linnean Transactions (t), and by Mr. Sowerby in his elegant work upon English Fungi (v), *Uredo Frumenti*. It grows upon the foliage, culm, and glumes, bursting in longitudinal streaks from under the *epidermis*. These gentlemen represent this plant as the *blight* of the wheat, which in certain seasons and soils is so injurious to that grain. I had myself for some time suspected that it was the cause of that disease; but after repeated examination of ears the straw of which was quite black with it, I had given up that opinion, for in no one instance was the grain injured by it. Yet I would by no means be understood to contradict the assertion of these gentlemen *in totum*. This plant, when it makes its attack before the wheat begins to harden, by depriving it of part of its nutriment may occasion it to shrink; and Mr. Lambert's own experience seems to confirm this observation: unless the mischievous plant which I shall next mention had taken possession of the ear, at the same time that the *Uredo Frumenti* had discoloured the stalk;

(s) *Linn. Transf.* vol. iii. p. 249, 250.

(t) *Id.* vol. iv. p. 193, 194.

(v) *English Fungi*, vol. ii. tab. cxl.

for the same circumstances would be favourable to the production of both, although we have reason to be thankful that the latter is much the most common of the two. I doubt not but these gentlemen will readily excuse my dissent from their sentiments in this instance; and should future examination prove me in the wrong, I shall with pleasure retract. In subjects not thoroughly discussed and understood, the collision of opinions contributes very much to bring hidden truths to light.

In the year 1797 the wheat suffered much by the *blight*, or *mildew* as our farmers more commonly call it, by far the worst enemy of that grain; and I had frequent opportunities of examining into the cause of it. The ears that were injured by it were to be distinguished at a considerable distance by their blackness; and when brought close to the eye, they appeared as if soot, or some other smutty powder, had been strewed over them. Under a common lens (for at that time I had no other) the chaff appeared covered with small black dots irregularly scattered over it, and widely different from the appearance of *Uredo Frumenti* upon the same part, which is very accurately represented in Mr. Sowerby's figure. Whenever this appearance seizes an ear, it invariably occasions the grain to shrink so much as to be fit for nothing but to feed hogs or poultry. I do not recollect making any observations upon the state of the straw; but I have a memorandum, made in a field from which I took many ears, which says that the straw of the mildewed wheat in that field was clean; and if my memory does not fail me, the mildew itself was always confined to the ear; though sometimes the straw might be affected, as I hinted above, by *Uredo Frumenti* at the same time. Some farmers, whom I have consulted, have told me that the straw is always injured; but others have confirmed my own observation in the field above mentioned, that it is not invariably so. I should observe, that the foliage

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of

of the mildewed wheat in this field was distinguished by another species of *Uredo*; though perhaps this might be only another appearance of the mildew, which discharged its seed at regular intervals in dots. From the absence of *Uredo Frumenti* in this instance, it is evident that the mildew is independent of that plant, and so *vice versa*. A whole district in the neighbourhood of Barham is particularly given to this evil; but improved management of the soil, I am told, will serve as a remedy. The appearance occasioned by the mildew, upon an ear examined under a lens, did not so fully convince me of its being a *Fungus*, as that of the four preceding species; the dots were too minute to determine with certainty without a more powerful magnifier: yet I am most inclined to that opinion; and it derives additional force from what was once related to me by a gentleman who had been abroad, that an Italian Abbate, I forget who, had written a memoir upon the subject, in which he had proved the mildew to be a very minute *Lycoperdon*. He promised to send me the pamphlet, but was not so good as his word. The present year produced no mildew, that I can learn; and I sent my specimens to Mr. Sowerby.

I have now brought to a conclusion what I had to say upon those parasitic *Fungi* which I have observed upon the wheat; and I hope that these hints, for such only I desire that they may be considered, may induce other gentlemen, more deeply skilled in this department of natural history than I am, to pursue them further. The subject, if viewed as closely connected with agriculture, is certainly important; and if the study of it should lead to a discovery of a method of preventing the *Blight*, as effectual as that which has long been used by farmers to secure their crops from the *Brand*, the naturalist who led the way to it would have no reason to think that his labours were in vain.

Much has been done in this country towards investigating the
Fungi

Fungi by Mess. Withering, Woodward, Dickson, Bolton, Sowerby, &c. yet the knowledge of this class of vegetables is *adhuc in incunabulis*, and many years must elapse before we may expect to see it upon the same firm footing with the other branches of botany. There is scarcely a leaf (at least of trees and shrubs) falls to the ground, that has not its peculiar *Fungus*, which, assisted by humidity, reduces it to its original earth. The same observation may be extended to sticks (*w*) and stalks, and many other substances. The more we attend to these things, the further we shall see into the plan of Divine Providence, and, every step we take, be more and more convinced that there is nothing either deficient or superfluous; but that all things are created in weight and measure, and work together (whether their office be to preserve or to destroy) to promote the best ends by the most efficacious means.

(*w*) Mr. Sowerby, in his *English Fungi* (vol. ii. tab. cxxxvii), has given the name of *decorticata* to a particular species of *Spharia*, as suggested by me, probably owing to my bad writing. The name I intended was *decorticans*, from the circumstance of its growing under the bark, and finally occasioning it to peel off.

XI. *Calendarium Plantarum marinarum.* By Dawson Turner, Esq. F.L.S.

Read March 5, 1799.

IN submitting to the Linnean Society a list of the periods at which some of the British marine *Algæ* produce their fructification, it may not perhaps be wholly unnecessary to preface it by observing, that the habitation of many of these plants at the bottom of the ocean, remote from any shore, where we are of necessity precluded from all possibility of tracing them through their several stages of growth, is certainly one of the greatest obstacles to our procuring a clear and comprehensive knowledge of them. How far the difficulties arising from this circumstance can ever be entirely removed, time and experience must alone determine; but we have reason to entertain very sanguine hopes, as the beauty of this tribe has of late years attracted many admirers, to whose zeal and abilities marine botany is much indebted; and this Society may boast of having given to the world by far the most valuable account ever written of these plants. But much still remains to be done; and it can be done only by naturalists resident upon the different parts of the coast accustomed themselves to examine attentively the various species in their several gradations, and laying before the world the result of their inquiries. To stimulate them to this, was one of my principal objects in bringing forward the present remarks; for, as no British author has given us any thing like a complete list of the times of fructification of the submersed *Algæ*, those naturalists who are in
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the habit of occasionally visiting the sea, and collecting its productions, are led to expect that whatever they find they will find in perfection; which has not unfrequently been the cause of error as well to themselves as to others. For, to mention one instance among many, the *Fucus subfuscus*, which is one of the most common species upon the Norfolk shore, and fructifies only in the earliest months of spring, is generally gathered in September, and often throughout the whole winter, with its stem and branches swollen in various parts; which swellings many very learned botanists have mistaken for fruit, and conceived themselves discoverers of either, what they called, diamorphous fructification, or new species; although, from having again and again, in company with my worthy friend Mr. Wigg, A. L. S. examined these tumours, I can safely pronounce them nothing more than the substance of the frond swollen, and caused, as I imagine, by some marine insect, the same being, though not so frequently, observable upon other *Fuci*. It were easy to enlarge upon this subject, and produce many similar instances of error; but as this one is sufficient to establish my point, I shall refrain from saying more at present, as I may probably at some future time lay before this Society a few remarks more particularly relating to the mode of fructification that obtains in these vegetables.

Having, on the foregoing accounts, been long conscious of the greater facility which would attend our investigation of the marine *Algæ*, could we fix with tolerable precision the times when we might expect to gather them at maturity, I have constantly habituated myself to commit to writing at what months I have found the different species in fruit; and though my list must necessarily be imperfect, as well because I am obliged to trust to the winds and waves, the nature of our shore not allowing us to visit them in their places of growth, as because we find upon our coast only a limited num-

ber, I nevertheless flatter myself with the hope that it may have its use, by inducing the botanists of distant counties to bestow some attention upon this neglected branch of a favourite subject. For its accuracy, as far as it extends, I can with safety vouch, as I have admitted nothing that has not been the result of my own actual observation, either upon *Fuci* found along the Norfolk shore, or upon a few which I have at various times received through the medium of sailors from the southern counties.

It now only remains for me to add, that a principal cause of the imperfection of the following Catalogue lies in our being wholly unacquainted with the fructification of many species, as *Fucus saccharinus*, *Filum**, *viridis*, &c. together with almost all the membranaceous *Ulvæ*, and a great proportion of the *Confervæ*; which genus I shall hardly mention, as our knowledge of the species is at present so imperfect, that it requires more than ordinary fortune to find two botanists who agree in assigning to the same plant the same name.

YARMOUTH,
February 10, 1799.

* This *Fucus*, figured in the *Flora Danica*, tab. 886, was, I believe, first discovered to be a native of Great Britain by Sir Thomas Frankland, Bart. F. L. S. and is occasionally gathered upon the Yarmouth beach. It deserves to be remarked, that when fresh it is of a beautiful orange colour, which it loses after having been a short time exposed to the air, and becomes of a pale verdegris green; but if kept in fresh water it changes this also to a dark brown.

JANUARY.

Fucus sanguineus.
sinuosus.
loreus.
ciliatus.
membranifolius.
radiatus.
lumbricalis.
plicatus.
filiquosus.
crispus.
bifidus.
nodosus.
ferratus.
patens.

FEBRUARY.

Fucus nodosus.
filiquosus.
ferratus.
subfuscus.
plicatus.
sinuosus.
crispus.
laciniatus.

MARCH.

Fucus nodosus.
ferratus.
plicatus.

VOL. V.

Fucus subfuscus.

filiquosus.
sinuosus.
crispus.
laciniatus.

APRIL.

Fucus nodosus.

ferratus.
plicatus.
diffusus.
subfuscus.
sinuosus.
crispus.
laciniatus.

Conferva coccinea. With.
polymorpha.

MAY.

Fucus subfuscus.
sinuosus.
laciniatus.
crispus.
diffusus.

Conferva coccinea.
polymorpha.

JUNE.

Fucus coccineus.
hypoglossum.

S

Fucus

Fucus kaliformis.
 dasyphyllus.
 asparagoides.
 byssoides.
 diffusus.

Conferva rubra.
 diaphana.

Ulva atomaria.
 purpurascens.
 ligulata.

JULY.

Fucus kaliformis.
 hypoglossum.
 byssoides.
 coccineus.
 asparagoides.
 pedunculatus.
 dasyphyllus.
 pinnatifidus.

Conferva rubra.
 diaphana.
 ciliata.

Ulva ligulata.
 atomaria.
 dichotoma.
 rubens.
 purpurascens.
 fistulosa.

AUGUST.

Fucus kaliformis.
 pedunculatus.
 purpurascens.
 byssoides.
 asparagoides.
 coccineus.
 dasyphyllus.
 bifidus.
 hypoglossum.

Conferva rubra.
 diaphana.
 ciliata.

Ulva ligulata.
 atomaria.
 dichotoma.
 fistulosa.
 rubens.

SEPTEMBER.

Fucus crispus.
 dasyphyllus.
 asparagoides.
 confervoides.
 bifidus.
 coccineus.
 purpurascens.
 laceratus.

Conferva rubra.

Ulva

Ulva rubens.
dichotoma.
atomaria.
fistulosa.

OCTOBER.

Fucus bifidus.
radiatus.
fastigiatus.
coccineus.
purpurascens.
crispus.
rubens.
laceratus.
membranifolius.
fanguineus.
ciliatus.
plicatus.
nodosus.
confervoides.

Conferva rubra.

Ulva dichotoma.
atomaria.

NOVEMBER.

Fucus filiquosus.
crispus.
bifidus.
purpurascens.

Fucus lumbricalis.
radiatus.
plicatus.
nodosus.
ciliatus.
pinastroides.
confervoides.
membranifolius.

Ulva dichotoma.
atomaria.

DECEMBER.

Fucus loreus.
nodosus.
lumbricalis.
crispus.
filiquosus.
fibrosus.
radiatus.
fanguineus.
purpurascens.
membranifolius.
ferratus.
sinuosus.
ciliatus.

Fucus vesiculosus and *Ulva diaphana* are found in fruit during the whole year.

XII. *An Account of the Onchidium, a new Genus of the Class of Vermes, found in Bengal.* By Francis Buchannan, M. D. A. L. S.

Read June 5, 1798.

THIS animal, which I have always found on the leaves of the *Typha elephantina* of Dr. Roxburgh, is very nearly allied to the Slug or *Limax*; but differs in so many of the circumstances considered by Linnæus as characteristic, that I imagine it will be found to constitute a new genus. To this I would give the name *Onchidium*, from the number of little tubercles with which the whole upper part of the animal is covered.

VERMES... Mollusca. Ore antico, corpore brachiato.

ONCHIDIUM.

CHAR. GEN. *Brachia* duo ad latera capitis. *Tentacula* duo. Os anticum. *Anus* posticus, infra.

ONCHIDIUM *Typhæ*.

Habitat in foliis *Typhæ elephantinæ*.

The body in its state of rest is oblong, convex above, about an inch long and three quarters of an inch broad, covering all the organs. When the animal creeps it becomes linear, obtuse at both ends, about an inch and a half or two inches long, and half or three quarters of an inch broad; and the arms and feelers of the animal then become visible. It is flat, black, and smooth below; above convex,

convex, ash-coloured, and covered with glandular tubercles irregular in size and position.

United lengthwise, on the under side, to the body is what Linnæus would call the foot of the animal, as being the organ of motion and stability. It is of a dirty yellow colour, linear, about a quarter of an inch shorter than the body at each end when in motion, and obtuse at the ends: it is flat below, and perpendicular at the sides. It consists of many transverse rings, like a *Lumbricus*, by means of which the animal can move with tolerable quickness, adheres firmly to the smoothest surfaces in all directions, and turns itself slowly round.

The head is yellowish, small, and placed under the fore part of the body, at the fore end of the foot, to which it is joined. During the various operations performed by the animal, its head is constantly changing its form and size; and, when entirely at rest, it is drawn up so as to be hardly perceptible. When fully expanded, the head is flat and oval below; and there is a mouth placed lengthwise with respect to the animal. This mouth also is constantly varying its shape from circular to linear. From each side of the head comes what Linnæus calls an arm (*brachium*), like those of the *Scyllæa*, constantly varying its form and size, and at times entirely drawn in. These arms are solid, compressed, and, when fully expanded, somewhat palmated; at least they are much broader and flatter towards the outer extremity. From the forehead arise two feelers, *tentacula* of Linnæus, exactly like the horns of a Slug, and having the appearance of eyes at their extremities.

This is not, like many others of the worm kind, an hermaphrodite animal, for the male and female organs of generation are in distinct individuals. I have not yet perceived any mark to distinguish the sexes while they are not in copulation, as, in both, the anus
and

and sexual organs are placed in a perforation (*cloaca communis*) in the under part of the tail, immediately behind the foot: but during coition the distinction of sexes is very evident, the penis protruding to a great length, considering the size of the animal. I have as yet learned nothing with regard to the gestation of the female, or how she produces her young.

EXPLANATION OF THE FIGURES.

TAB. V. *fig. 1.* The under side of *Onchidium Typhæ.*

2. The upper part.

3. The side view of the head.

Linn. Trans. V. tab. 5. p. 134.

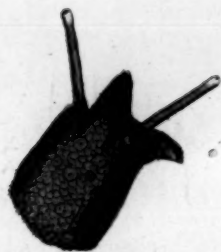
fig. 2.



fig. 1



fig. 3



Onchidium typhae.





XIII. *Remarks on some technical Terms used in Botany.*

By R. A. Salisbury, Esq. F. R. S. & L. S.

Read July 3, 1798.

AFTER the scientific Observations of Professor Martyn on Botanic Language, published in the first volume of this Society's Transactions, and in an English translation of the *Termini Botanici* of Linné, any thing further on the same subject may seem unnecessary: but I am in the habit of using some terms in a sense different from the Linnæan definitions, and of excluding as well as introducing others, in my descriptions of plants; and I wish to learn how far the opinions of more experienced botanists agree with my own. Should I be encouraged, I may probably in future study this part of botany more particularly. What I have now to offer follows alphabetically.

Abbreviatus. This term in *Amæn. Acad.* is only mentioned under Perianthium, where an abbreviated perianthium is defined, not so long as the tube of the corolla. I recollect no instance of its being used in descriptions; so that it is scarcely worth retaining except for a specific name. *Brevis* supplies its place, and admits of degrees of comparison more readily.

Abruptè pinnatum folium. I consider every leaf which terminates without an odd foliolum, as abruptly pinnated. Linné excludes *Cirrhus* also, or any other part: but, in that case, such a leaf
would

would rarely be met with ; for I have yet seen no abruptly pinnated leaf, which had not some little process or other beyond the last foliola. *Cirrhi* are inserted very differently in different plants ; and being particular organs destined to support scandent stems, their insertion should always be separately mentioned.

Acetabuliformis. Like a circular shallow faucer with the sides more or less incurved. *Tab. 5. f. 4.*

Acicularis is nearly synonymous with *subulatus*, but I consider it as indicating a more delicate and pungent point.

Acuminosum folium. This I would define, apice in acumen planiusculum attenuatum, to distinguish it from all other points.

Adscendens. Synonymous with *incurvus*.

Adversorum foliorum paginae superiores, a directione quâ inferuntur ratione caulis, versus cœlum vertuntur, hinc quantum maximum lucis obtinentes : ut folia *Ulmæ campestris*, Linn.

The definition of this term in *Amœn. Acad.* is exceedingly obscure, and can be understood only from examples of it. All the *adversa folia* I have seen were both *disticha* and *obliqua*, according to the Linnean meaning of *obliqua*.

Æquata superficies omnis inæqualitatis expers est : nec canaliculata, striata, scrobiculata, punctata, &c.

I have found this term very useful : it differs from *planus*, in not requiring the part to be level, or in a rectilinear direction, but frequently occurs in round bodies ; as in the peduncles of *Ixiæ*.

Alveolata pars depressionibus oblongis exaratur ; ut ^rtopus *Liriodendri tulipifera*, Linn.

Affurgens

Assurgens scarcely differs from *adscendens* or *incurvus* : it seems peculiarly proper to describe the change which takes place in the position of the leaves of *Mimosæ* and other sleeping plants.

Axis. Synonymous with *Columella*.

Bina folia. Leaves inferted in three very different ways may yet all be called *bina* : either when they are opposite, as in *Lamium*; fasciculated, as in *Pinus*; or approximated, as in the flowering branches of *Datura*.

Calathiformis. Bowl-shaped : hemisphærical and concave. *Tab. 5. fig. 5.*

Calyx. Jussieu, to whose judgement I pay the highest deference, contends that this term is the most proper for that involucre, which in the natural order of *Liliaceæ* has hitherto commonly been called corolla. Among other reasons he adduces the Linnæan canon, that this part is a continuation of the cuticle of the plant. I very much doubt, however, if this really be true; for the spathe in this natural order seems to me the first expansion of the cuticle, and the true calyx. A proper bractea will always be found at the base of the pedunculus, though in many genera it is hid between the insertion of the leaves; but in *Hæmanthus* it is coloured, and very conspicuous.

Campanulatus. Somewhat like the bell of a church; at the base more or less bellying out, with the rim a little recurved. *Fig. 6.*

Capreolatus. Synonymous with *cirrhosus*.

Circinalis. This term is confined by Linné to describe the manner in which the young spikes in the natural order of *Boragineæ*, and

the young leaves of *Filices*, are rolled up : it is then synonymous with either *involutus* or *revolutus*.

Colum. A common receptacle on which the seeds are inserted in some pericarpiums : it is probably analogous to the placenta in animals, and very conspicuous in the natural order of *Didynamia Angiosperma*.

Cotyliformis. This term differs from *acetabuliformis* in having straighter sides not incurved. *Tab. 5. fig. 7.*

Crateræformis. Somewhat like *calathiformis*, but not so much bellying out, and rather approaching to *infundibuliformis*. *Fig. 8.*

Cyathiformis. Like a wine-glass : more or less obconical and concave. *Fig. 9.*

I have found this, and all the other terms of which I have given figures, very useful in distinguishing some of the species of *Narcissus* and *Erica*.

Declinatus. Bent down.

This term is rendered quite unnecessary by *deflexus*, *recurvus*, and *reclinatus*, which express the mode of flexion more precisely.

Discus. The surface of any part excluding the borders.

So I would distinguish it from *Pagina*.

Elliptica pars longior quam lata est, marginibus medio lineis fere parallelis, extremitatibus plus minus semicircularibus, æqualibus.

Linné often confounds this term with *oval*.

Fastigiatus, according to the two Linnean definitions, is synonymous with either *corymbosus* or *conicus*.

I now only use it for any part that is towering or lofty.

Favosus.

Favosus. Somewhat like a honeycomb.

This term will be found very useful in describing the receptacles of the class *Syngenesia*.

Flagellum. Professor Giseke wishes to distinguish a *Caulis sarmentosus* by this title: but I think two names for one part unnecessary; and on the same principle I reject *Culmus*, *Scapus* and *Frons*, for *Caulis*, *Pedunculus* and *Folium*.

Hypocrateriformis corolla. I would distinguish this by its having the lower part of the limb perfectly horizontal with respect to the tube: not by the shortness of the tube.

Irregularis corolla. Having its parts differing in proportion.

The essential character of an irregular corolla seems to me to respect solely proportion. Many species of *Gladiolus* have all the divisions of the corolla exactly alike, except the uppermost being a little more erect; and yet they are evidently irregular.

Lamina. I always, with Forskäl, describe the upper part of a petiolated leaf by this term. *Limbus* I confine to corolla, even in polypetalous as well as monopetalous flowers.

Lenticularis. Plus minus sphaericus margine acuto; instar feminum *Dracænæ ensifoliae*, Linn.

Ligulatus. Somewhat linear, and much longer than broad.

Lyræformis. Figura superne semiovalis, inferne angustior lateribus lineâ plus minus arcuatâ excisis.

The flowers of *Ixia grandiflora*, *Roch.* afford an example of this term.

Marcescens. Not falling off after it is withered; in which sense Lœfling uses it.

Medioliformis. Somewhat globular and truncated at both ends, like the nave of a wheel.

The tube of *Cynoglossum omphalodes*, Linn. is an instance.

Meniscoideus. Somewhat globular, with one side concave.

Nitidus. Synonymous with *lucidus*.

Obliquus. Aslant: cut away in a sloping direction, like the flowers of *Vinca* and leaves of *Begonia*.

Linné has defined this term very differently, and has given for examples of his meaning the leaves of *Protea* and *Fritillaria*: these leaves, however, may be more properly called *torta*; and he himself sometimes uses *obliquus* in the sense I have given to it above.

Pagina. The whole surface of any part, including the border.

Papillaris. Somewhat like a nipple.

I think this term should be distinguished from *verrucosus*. *Papillofus* sounds too like *papulosus*.

Persistens. Continuing a long while green with respect to the other parts of the same flower or plant.

Poculiformis. Hollow and cylindrical with an hemispherical base, the sides at the top straight, and not recurved. *Tab. 5. fig. 10.*

Prismaticus. Synonymous with *triqueter*.

Receptaculum. The common support or base of more flowers than one : it is a very important part in the class *Syngenesia*.

Reclinatus. Curved first in a convex, then in a concave line ; like the leaves of many species of *Erica*.

Scrobiculata pars depressionibus majusculis suborbicularibus excavatur ; ut colum *Trientalis europææ*, Linn.

Spiralis linea uno pluribusve circulis sensim elevatur.

The different parts of vegetables may be either spirally inserted, like the flowers of *Ophrys spiralis*, Linn. or spirally directed, like the leaves of *Costus speciosus*, Smith. : or they may spirally extend themselves, like the stem of *Vallisneria palustris*, Linn.

Strophiola. A fungous or callous appendage placed about the hilum in the seeds of many genera : it is very singular in some of the species of *Mimosa* and *Glycine* from New Holland.

Tortum folium. More or less twisted.

Twisted parts should be accurately distinguished from *spiral* parts, though the same direction occurs in both : but in the former the axis of the spiral line is in the parts themselves ; in the latter quite distinct, or out of them.

Torus. The common support, or base, of the different parts of a simple flower.

In many flowers it is very small, and entirely hid by the parts inserted upon it ; but in *Ranunculus*, *Passiflora*, *Magnolia*, and many other genera, it becomes very conspicuous.

Trapeziformis. An area with four unequal sides.

Trochlearis.

Trochlearis. Pulley-shaped, or like a cylinder that is narrowed in the middle.

The embryo of *Corypha* is an example of this term.

Turbinatus. Top-shaped: it only differs from Pear-shaped in being shorter, and more suddenly attenuated at the base.

Verrucosus. Covered with rough tubercles like warts.

EXPLANATION OF THE FIGURES.

- TAB. V. fig. 4. Corona acetabuliformis Narcissi Radiiflori, *Salisb. Prodr.*
5. Corona calathiformis Narcissi Grand-Citronier, *Floristarum.*
6. Flos campanulatus Scillæ campanulatæ, *Soland.*
7. Corona cotyliformis Narcissi patellaris, *Salisb. Prodr.*
8. Corona crateræformis Narcissi ampli, *Salisb. Prodr.*
9. Corolla inferne cyathiformis Apocyni Androsæmi-folii, *Linn.*
10. Corona poculiformis Narcissi poculiformis, *Salisb. Prodr.*

XIV. *Account of a Cavern discovered on the North-west Side of the Mendip Hills, in Somersetshire.*

By George Smith Gibbes, M. B. F. L. S.

Read April 2, 1799.

PERHAPS the following account of a cavern which I visited some time since may be acceptable, as we there see the process going on, which Nature employs to enclose foreign substances in the hardest rocks.

At the bottom of a deep ravine on the north-west side of the Mendip Hills, in Somersetshire, near the little village of Berrington, there has been discovered a cavern of considerable extent, in which was found a great collection of human bones.

As I have observed in this cavern many circumstances which appear curious to me, I beg leave to mention them, as I do not believe there is another place in the kingdom where the different stages (if I may be allowed the expression) of bones incorporating with limestone rocks can be so well seen. From the top and sides there is a continual dripping of water, which being loaded with a large quantity of calcareous earth, deposits a white kind of paste on most parts of the cavern. Many of the bones are incrustated with this cement, and a large proportion of them are actually fixed in the solid rock. I suppose therefore that this substance, which at first is in a state resembling mortar, by losing its water hardens into a firm and solid stone.

stone. I had an opportunity of examining the process in every part. Had the cavern not been discovered, and these deposited substances not been removed, I do not doubt that the whole excavation would, in no great length of time, have been completely filled up. The water was still bringing fresh quantities of calcareous earth, and the bones were in some places completely incorporated with the solid rock. Every degree of intermediate solidity was plainly discernible. There were several nodules of stone, each of which contained a perfect human skull. The substance which is deposited from the water effervesces with acids, and has, in short, every character of limestone. At the farther end of this very curious cavern, where the height is about fifteen feet, there depends a most beautiful stalactite, perfectly conical, which, when the cavern was first discovered, reached within an inch of a cone of the same kind which rises from the floor. By some accident a small part of the stalactite was broken off; but Nature is now busy in repairing an injury which had been done to one of the prettiest productions of her mineral kingdom. Had these two cones met, a most beautiful column would have been formed, of nearly fifteen feet in height. On striking this stalactite, a sound is produced similar to that of a bell, which may be heard at a considerable distance beyond the mouth of the cavern.

I examined the bones with considerable attention, and I found that there was adhering to the surface of many of them, a substance which resembled the spermaceti I have before described, in the Philosophical Transactions for the years 1794 and 1795.

I have to add, that this cavern was discovered about two years ago by accident, and that no satisfactory reason has been given for this singular accumulation of human bones.

XV. *Remarks on the Nature and Propagation of marine Plants.*

By Lieut. Col. Thomas Velley, F. L. S.

Read May 7, 1799.

HAVING, in a former inquiry into the mode of propagation peculiar to marine plants, attempted to point out some material errors, which accompanied the theories of Gmelin and Gærtner, by proving, that the membranaceous *Fuci*, which the former considered as merely proliferous, derived their origin from actual seeds; and that the numerous tribe of *Conservæ*, which Gærtner, upon a very slight and superficial examination, has dogmatically declared to be destitute of seminal increase, were beyond a doubt dependent upon the same general law of Nature, for their propagation, as the *Fucus*: I shall now lay before this Society some further observations upon the subject, arising principally from an examination of the recent theories that have very lately made their appearance in the world. It may not however be foreign to the purpose, to investigate the definition of the generic character prefixed by Linnæus to the *Fucus*, and which does not appear to be clearly stated.

In the *Genera Plantarum* he defines the supposed male flower as follows: "Vesiculæ glabræ, cavæ, pilis intus aspersæ;" rendered by the Lichfield Society, "Vesicles smooth, hollow, sprinkled with hairs within;" and in the *Nereis Britan.* "Bladders smooth; hollow, interspersed within with soft hairs." Linnæus, however, cautiously introduces this definition upon the authority of Reaumur;

he disclaims all pretensions to the discovery upon which it is founded, and moreover asserts, in the *Philosophia Botanica*, that the florescence of the *Fucus* had been first brought to light by that author. Now Reaumur in no instance admits that the male flowers are contained in the air-bladders. On the contrary, he positively maintains that the pencilled clusters of fine hairs, spread on the surface, are the male flowers exclusively. Whatever ambiguity, therefore, may be attached to the word "vesiculæ" as applied by Linnæus, or however he may have varied his mode of expression at different times, still we are to recur to the account of the discovery, as stated by Reaumur, for the real import and meaning which ought to have been conveyed in the definitions of Linnæus; since on that alone his doctrine of the male flower appears to rest. The description cited above from the *Genera Plantarum* seems evidently to relate to the air-bladders in the *Fucus vesiculosus*, and has induced some authors to consider the fructification as confined to those parts*;—while others again, pursuing the same opinion, and who at the same time adopt the doctrine of Reaumur and Donati, that the pencilled clusters of hairs, scattered over the surface of the frond, are the male flowers, will find themselves reduced to the necessity of admit-

* In the last edition of the *Botanical Arrangements* it is observed, under *Fucus vesiculosus*, that "the bladders in the substance of the leaf contain the fructification." Dr. Withering, agreeably to the method which he has constantly pursued throughout that valuable work, very properly produces the authority of Linnæus in support of the above opinion. In the same work, the *Fucus serratus* is also noticed as having "two kinds of fructifications sufficiently obvious;" i. e. the seed-vessels in the summits, and the clusters of fine hairs externally situated. But it must not be passed over, that the same appearances are equally obvious on the *Fucus vesiculosus* and all its varieties. Admitting therefore that the male flowers are contained in the air-bladders, the *Fucus vesiculosus* must of course have three distinct parts of fructification; one exposed, another concealed, and the third in the summits (universally admitted) producing the seeds.

ting two different males, on the same plant, operating in a manner not only distinct from, but directly opposite to, each other: for one of them (as we have just seen) is described as internally situated and concealed in the air-bladders, while the other is external and exposed to view in those small open vessels upon the surface of the plant*. But such an œconomy does not appear to have proof or analogy

* My friend Mr. Stackhouse had adopted the same opinion in his very ingenious investigation of these plants, and mentioned "the monœcious character as clearly discernible in some" of the *Fuci*; as also the twofold state of the male flowers, one of which is represented as externally situated, and exposed to view in the urceolate vessels; the other, concealed in the air-bladders—"in interiore vesicularum grandiorum." In a subsequent fasciculus he informs us, with that true spirit of candour which directs his researches and entitles them to the most respectful attention, that the doctrine of a monœcious character must be totally abandoned, since upon a more critical and attentive examination he finds "the previous fructification is effected internally." This last point being admitted, there hardly remains a shadow of difference between our respective opinions, as far as relates to the propagation of this curious tribe of plants. I must observe, however, that as I could not in the first instance attribute to those capillary vessels the important function which belongs to a state of florescence, so neither can I reconcile myself to a contrary extreme, "that those filaments might be nothing more than an exuding mucus"—admitted in the second fasciculus of *Ner. Brit.* p. 13. This opinion is taken up principally upon the disappearance of those fine hairs when immersed in water; as if they at once became resolved into a mucous fluid. But the fact is, they still remain in the same unaltered state, and may be discovered in the aquatic microscope in a strong light during their immersion. Their extreme tenuity and minuteness may cause them to collapse, and adhere to the surface of the plant; and their tone of colour, which may assimilate itself to that of water, will no doubt render them difficult to be seen. These pencilled clusters are represented in the first plate and fasciculus of the *Ner. Brit.* in their urceolate vessels. If they were destined to carry off the mucus, they would not be excluded from the internal mass by those callous vessels in which they are confined. If they were part of the fluid, they would be of very different lengths. Besides, these filaments exist when the plants are in their first and most tender state (as I have observed upon a former occasion), and before they produce the least appearance of mucus. This fluid is not constantly produced, and principally abounds in a state of maturity. In summer time it may sometimes be seen

analogy to support it, throughout the whole vegetable creation. The locality of two such bodies demonstrates their respective functions to be diametrically opposite; for, while the favourite idea of florescence may suggest the possibility of external communication, between the minute filaments on the surface and the fructified summits which contain the seeds, the situation of the second flower in a bladder, so impervious as to retain its internal air, necessarily excludes the possibility of a grosser body escaping externally through such a substance. Should it be asserted, that the fecundating principle therein contained may be of so pervading a nature as to find an internal course through the solid coriaceous texture of the frond itself; although, for reasons which I shall hereafter assign, I cannot admit that it exists in those bladders, yet I concur in the general principle. It is what I have chiefly endeavoured to point out in my former tract upon this subject. If then, to use the expression of the ingenious author of the *Nereis Britannica*, "the impregnation may be effected by a subtile vapour," in other words, by some unknown operation, the fact seems highly probable. This is "that self-inherent principle" which I before asserted to exist, and upon the apparent œconomy and wisdom of the Divine Author, "who has admirably tempered the constituent principles of natural bodies in such due proportions as might best fit them for the state and purposes they were intended for*." But then we ought not, upon mere hypothesis, to wrest such hidden faculties (for unknown surely they are) from their inscrutable course, and arbitrarily assign their effects to the supposed

before it is disengaged from the frond; and then it forms a very curious depôt immediately under the surface, appearing like distinct globules extremely minute. In this state I have seen it in very thin transverse sections of the *Fucus saccharinus* under the microscope. At first sight I flattered myself I had discovered the seeds of that *Fucus*.

* Hales.

mechanical operation of parts, which are neither calculated to promote, or capable of communicating, those reciprocal functions which result from a state of florescence.

It has been justly observed by one of the greatest philosophers of the present age*, "that Nature though varied is generally uniform in her operations." The more we contemplate the extensive volume which she presents to our view, the more this observation will become confirmed: but while it tends to vindicate the existence of a principle equivalent to, as I have before maintained, though differently modified from, that which directs the sexual system, it cannot reconcile itself to the assumption of two distinct males acting by different processes in the same plant, any more than it can admit either of those bodies separately to constitute a state of florescence, when, from their permanent and unchangeable nature through all the successive periods of the plant's existence, as well as from their relative situations, they militate against every law of analogy, as far as respects the Linnean system.

Linnæus, when he maintains the universal influence of the laws of florescence over the vegetable world, closely defines the precise character of the flower itself, asserting, that its very essence exists in the stigma and antheræ, which, connected with the pollen containing the fertilizing vapour, can alone constitute a state of florescence; and that, without these essential parts, even the blossom with its exterior appendages could not in any respect be considered as a flower.

The uniformity and mechanical exactness which directs the sources of vegetable impregnation, throughout the immense series of terrestrial plants, could not fail to attract the admiration of the recent votaries to the sexual system. Strengthened in their opinions

* Sir William Hamilton.

by the general conformity of the laws of Nature, and exulting in the confutation with which modern discoveries had overwhelmed the former prevailing theories, it is not matter of surprise that they should have established the laws of florescence upon so strict a dogma. Science, too long insulted by the preposterous tenets of equivocal generation, had already turned away in disgust from the ancient writers, who favoured that ill-founded doctrine. The principles of vegetable life now became the object of philosophical discussion; and the important discovery of Harvey, which had long since brought to light the circulation of the blood, seems, by an easy transition, to have directed the researches of Hales towards a similar principle in vegetable bodies; when, at length, the propulsion of the sap became beautifully exemplified by his unerring staticks. Every day brought forth new discoveries; and those plants which had apparently furnished the strongest arguments to the opponents of the system, were now compelled to disclose their mysterious œconomy, and, by exhibiting the hidden sources of their impregnating powers, seemed at once to establish the universal extent of the newly established doctrine. When Linnæus first announced the discovery of seeds in the Moss, was it to be expected that he should withhold his credit from the florescence of the *Fucus*, when brought to light by one of the most respectable philosophers of his day? The florescence however of the *Fucus*, as it is stated in the *Nereis Britannica* to exist, derives no support from that of the submersed plants. On the contrary, the latter tend to establish a strong argument against the abovementioned theory. Almost all those aquatic plants that are fertilized by actual pollen, a substance known to be immiscible with water, emerge at the time of their impregnation. Let us examine, as next in succession, the very few which do not emerge. And first the *Isoetes* seems to present itself, whose flower

is

is so carefully enveloped with an impenetrable barrier, formed by the concave position of the leaves, that the pollen is enabled to convey its fertilizing vapour in an element, which by contact would obstruct the progress of fecundation. The genus *Chara* seems to indicate an approach towards that terminating point, where the mechanical floescence ceases at length to act. Some respectable authors, and Haller among the number, do not admit that the supposed antheræ can be invested with the faculty of impregnation, because they are permanently included in an impervious part of the plant. Hedwig, who has defined the floescence of this genus with great precision, acknowledges himself to be totally at a loss to account for that operation, because the spherical vessel, in which the antheræ* are included, has no external communication with the approximating germ. It is very probable, however, that the vessel alluded to may, from its contiguity to the lower part of the germ, convey thither, at the point of contact, the impregnation by an internal process. A very slight comparison will at once discover the total want of similitude in structure, situation, and œconomy, between the vessels of the *Chara*, in which the fecundation appears to be carried on internally, and those air-bladders in some of the *Fuci*, supposed to be the residence of the male flower.

Enough has already been said upon the Linnean state of floescence. We have a clear and restricted definition of its constituent parts, while its laws are found to accord with surprising uniformity through all the various classes, which were formed by the great founder of the system. Yet there is a point where its accustomed mechanism ceases to act; where the nature and agency of its impregnating powers undergo a material change. And here surely we may pause, to contemplate the versatile power by which Nature is

* *Theor. Hedw.* p. 129.

enabled to vary, without disuniting, the general principles of her established laws. "She disdains," as Mr. Lightfoot has finely observed, "to be limited by the systematic rules of human invention. She never makes any sudden starts from one class or genus to another, but is regularly progressive in all her works, uniting the various links in the chain of beings by insensible connections."

We have lately seen this mysterious subject discussed by no ordinary investigator of Nature's laws*. The principle upon which this discerning naturalist proceeds, appears to be well founded; and if he fails in any respect, it is by overstraining his theory to make it quadrate with the Linnean doctrine of floescence. From this circumstance principally, he has, in my opinion, exposed his argument to some objections which may not easily be removed. He commences his essay with a concise and perspicuous survey of the existing theories laid down by Reaumur, Gmelin, and Gærtner. And as the two last of those authors maintain that a very numerous branch of the *Algas* do not in any instance derive their origin from seeds, but solely from proliferous gems, or buds, he opposes the doctrine with much ingenuity; not grounding his opinion merely upon the laws of analogy, but upon a scientific and an anatomical inquiry into the natural structure and constituent parts, as well as situation, of these corpuscles.

Having, as far as the nature of the subject would admit, established these points so consonant with sound philosophy, he proceeds to account for that peculiar process to which the seeds themselves owe their origin; and this he considers as an actual state of floescence. "If pollen," continues this author, "under the shape of farina, be unfit for fecundation in the water; if Nature has taken

* Mr. Correa de Serra on the Fructification of the submersed *Alga*, in The Philosophical Transactions for the year 1796, p. 494.

a particular care to guard this operation from the presence of that element; if pollen can exist in an active state under a mucous appearance; and if the antheræ of perfectly submersed flowers are nothing else than closed vessels filled with mucous pollen; what doubt can we entertain, that the mucilaginous vesicles of the submersed *Algæ* (which contain also their seeds) are antheræ?"

I shall now briefly consider this theory of floescence, as taken up upon the principles established by Linnæus, and explained in the technical language of that author. It may perhaps scarcely be worth while to observe, that Mr. Correa de Serra, at the beginning of the above passage, appears to make a distinction between the terms *pollen* and *farina*, which in fact are merely synonymous. Pollen, as explained by Linnæus in the *Philosophia Botanica*, seems to have a reference to the exterior form and appearance of the body itself, more than to the fecundating vapour or power contained within it, to which it acts principally as a vehicle*. This part of the flower being almost universally found under a farinaceous form, is distinguished by the appropriate term *pollen*, which implies a fine meal. Waving therefore any objection that might be raised against the expression "mucous pollen," I cannot pass over a subsequent remark, in which the faculty of impregnation is attributed to the part containing the seeds; and the province of the antheræ, so distinctly preserved in the sexual system, is nearly blended with that of the seed-vessel. The passage alluded to is the following: "What doubt can we entertain, that the mucilaginous vesicles of the submersed *Algæ* (which contain also their seeds) are antheræ?" In short, if the reproduction of these plants is to be elucidated by the Linnean theory of floescence, and its concomitant terms, especial care should be

* Generationem vegetabilium fieri mediante pollinis antherarum illapsu supra stigmata, quo rumpitur pollen, efflatque *auram feminalem*, quæ absorbetur ab humore stigmatis.

Pb. Bot. sect. 145.

taken to preserve a strict connection, and uniform correspondence, between the parts described, and the definitions by which the theory is supported. Gärtner, in his remarks upon some of the *Fuci*, finding that their fecundation was effected by an internal process, maintains likewise, that the part containing the seeds is also endued with the faculty of impregnation. But this author gives an unphilosophical and a fanciful cast to his hypothesis, in adopting an unisexual distinction, when he supposes that the female organ impregnates itself, or rather, the ovula which it contains—"quod ipse uterus sua fecundet ovula, et quod ille ipse officia genitalium utriusque sexûs, præstet solus."—Upon examining the mucilaginous vesicles (or, strictly speaking, the distended summits) in which the seeds are placed, and considered also by Mr. Correa de Serra as the antheræ, it will appear that the seeds are very seldom fixed in a loose and naked state, but contained in minute hard coriaceous tubercles, on all sides impervious*, and most firmly attached to the interior surface of the summit, in the vesicular *Fuci*; and that in these tenacious tubercles the seeds may frequently be discovered long before the solid cellular mass becomes changed into a mucilaginous substance. Again, in several species, the central substance, in which the seeds or pericarps are placed, always remains in an invariably solid state, and is never converted into mucilage. This is decidedly the case in the *Fucus ferratus* †, and I never found it otherwise in the *Fucus nodosus* and some others; and yet the seeds of both those plants are produced in the same manner as in the *Fucus vesiculosus*. From these facts there is great reason to conclude, that the mucus, which is found at certain seasons in several of the *Fuci*, is not essentially necessary to their impregnation. And as it seems to abound most in

* See the horizontal section of one of the summits of *Fucus vesiculosus*, in which the tubercles or pericarps are represented. *Vell. Marine Plants*, plate 1.

† See an horizontal section of this *Fucus* magnified, *Marine Plants*, plate 1.

the mature plants, I am induced to suppose that it may be a kind of suppuration brought on by age, and possibly may be instrumental in facilitating the escape, or dispersion, of the seeds.

A plausible remark in favour of the hypothesis is urged by the ingenious author in the following words: "The pollen of any flower, when put into water, in a very short time begins to move; and its particles agitate themselves in every direction, perfectly resembling the most lively animalcula. Their activity in this state lasts some time; but if the least quantity of salt be put into the liquor, death quickly ensues, from which they never more recover. This inclosed mucilaginous fructification was therefore the only one which could ensure existence to vegetables living chiefly in sea-water, with which their mucus is found to be immiscible."

It is very far from my intention to misrepresent the meaning of the passage. It strikes me, as alluding to a provision which Nature has made to protect the impregnating body from the deleterious effect of saline particles (which would at once destroy the active principle of pollen), by fixing it in a menstruum which is immiscible with sea-water. The supposition is ingenious. Yet is Mr. Correa de Serra aware, that this very mucilage is not free from the infection of salt;—that saline particles may frequently be found upon the surfaces of dried specimens;—that in dissections under the microscope similar appearances may be discovered, which suddenly shoot into minute crystallizations;—and that it is owing to this saline quality which seems intimately combined with the very texture and constituent parts of the *Fuci*, that they possess the property of an hygrometer for years after they are dried*?"—From these circumstances it

* I am induced, from an observation of Mr. Lightfoot, to attribute this circumstance to the natural quality of the frond, rather than to the effect of the sea-water in which it grew. That author remarks, that if the *Fucus saccharinus* be soaked in fresh water, then

it appears to be highly probable, that the pollen of marine plants, if such a body in reality may exist in the mucilage, must be totally different in its quality from the pollen which carries on so important a function in the sexual system: it must also be totally different in its substance, because it is not to be discovered by the greatest magnifying powers.

But, giving the utmost scope to the hypothesis, and admitting that this mucous pollen is attendant upon all the marine plants, either internally or externally; still it must contain some subtle vapour, capable of passing through the coriaceous texture either of the tubercular pericarps or of the frond. And after all, what does this amount to? Nothing more than that some undefined vivifying principle, resident in the internal substance of the plant, brings on a state of impregnation, and answers every purpose which the more obvious mechanical laws of floescence produce externally in an atmosphere, where no impediments exist to render their process abortive.

After what has been already advanced, it may appear almost superfluous to produce any further arguments against the floescence supposed to be concealed in the inflated parts of the vesicular *Fuci*. I shall therefore only briefly add, that the *Fucus ferratus* is entirely destitute of the air-bladders, and yet produces its fructification in a similar manner to the *Fucus vesiculosus*; but the advocates for floescence may attribute the impregnation to the small external filaments so often noticed. *Fucus siliquosus* and *F. nodosus* are perfectly free from those minute fascicles; but then again the impregnation may possibly be ascribed to the tracheæ in the vesicles or inflated leaves. What then remains to be said of the *Fucus canaliculatus*,

dried in the sun, and afterwards deposited, it will in a short time be covered with a white efflorescence of sea salt.

which is entirely destitute both of the vesicles and the external filaments, and yet produces its seeds in a manner exactly similar to that before described?—In short, as the means by which Nature conducts her operations are always appropriate to her ends, we may conclude, that if the fine vessels or fibres in the vesicles had any immediate reference to a state of florescence, they would either be extended throughout the internal substance of the frond, to carry on their secret and subtile operation; or would be furnished with some external apparatus, which might give colour and support to the hypothesis.

A particular description of the air-bladders, or vesicles, which form a curious part in the structure of several of the *Fuci*, will close these remarks. It might naturally occur to any casual observer, that the vesicles alluded to could not be formed, if they had not some means of collecting and retaining a greater portion of air than that which may exist in an equal given space of the solid frond. Nature therefore seems to have furnished them with numerous tracheæ or air-vessels, surpassing in tenuity the finest hair. These are a combination of fibres inosculated together, which proceed from the cellular substance, and freely exert their elastic influence from the interior surface of the cavity. They may be found in all the inflated *Fuci*; and as they are very similar in their appearance, so, probably, they may be in their œconomy, to that fine woolly substance which is found at the broken ends of some leaves, and which the learned Grew has pronounced to be a skein of air-vessels. These capillary vessels in the bladders of the *Fucus* probably contribute their aid to dilate and extend that part of the frond into its oval and vesicular form; and bring part of that elastic fluid into action, which is well known to exist in all plants without exception. Since this paper was written a remark has made its appearance, in a very valuable
work

work upon the subject of the *Fuci**, which attributes the formation of those fine vessels to the laceration of the internal substance, as the sides become dilated into the air-bladders. An examination of these slender threads under the microscope will probably induce the observer to entertain a different opinion. If they originated from the cause supposed, they would appear in a lacerated unconnected state; and, being formed from the broken mass, could never be so curiously anastomatised one with another: neither would the relaxed and dissolved contents be drawn out into tubular and jointed forms. Besides, these capillary vessels generally dilate at the point of inosculation, forming a kind of joint, in an uniform manner. It is very difficult to conceive that a texture surpassing in tenuity the finest web, and at the same time so curiously organized, should be produced by a general revulsion of the expanding mass.

* See *Transactions of the Linnean Society*, vol. iii. p. 91, 92.

XVI. *Description of Sowerbæa juncea, a Plant of New South Wales.*

By James Edward Smith, M. D. F. R. S. P. L. S.

Read July 2, 1799.

THE essential character of the genus of *Sowerbæa* is already published in the fourth volume of the Linnean Society's Transactions, p. 218, as follows :

Corolla infera, hexapetala. *Filamenta* tria, biantherifera, sterilibus tribus interstinctis.

It belongs to the Order of *Asphodeli* of M. de Jussieu, and should be arranged in the same section with *Allium*. One part of the character of that section, *radix bulbosa*, requires however to be omitted, as being neither necessary to discriminate *Allium*, nor applicable to the genus before us.

Sowerbæa is strikingly distinguished from every plant of the same natural order by having two antheræ upon each filament, each of which consists of two cells, and bursts by two pores at the top. Between the filaments which bear antheræ, three short blunt barren ones are inserted. The antheræ separately considered agree in structure and manner of bursting with M. de Lamarck's genus of *Dianella*, *Juss. Gen.* 41; but in that each stands on its own filament, and the fruit moreover is a berry.

In the Linnean System *Sowerbæa* must be placed between *Aphyllanthes* and *Allium* in *Hexandria Monogynia*; for every analogy, as well

well as the structure of its parts, proves it to be truly hexandrous, though at first sight it might seem triandrous.

We are as yet acquainted with but one species of this genus, discovered by Mr. White near Port Jackson in New South Wales, and now not unfrequent in the nurseries about London. It requires the shelter of a greenhouse, and thrives best in bog earth with a considerable degree of moisture. It may be named

SOWERBÆA JUNCEA.

Root of many long simple fibres.

Herb smooth.

Leaves radical, sheathing, upright, linear, sharp-pointed; channelled above; convex beneath.

Stipula within the leaf, simple, white, membranous, obtuse, concave.

Stalk solitary, taller than the leaves, erect, simple, naked, round, smooth, solid.

Umbel terminal, many-flowered, spreading.

Braçtææ several, ovate, coloured, shorter than the umbel.

Flower-stalks simple, thread-like, single-flowered, naked.

Calyx none.

Petals six, equal, ovate, pale purple, spreading, permanent.

Filaments smooth, greenish.

Antherææ yellow.

Germen superior, roundish, smooth, with three principal furrows and three smaller intermediate ones.

Style erect, rather longer than the stamina.

Stigma simple.

Capsule



Linn. Trans. V. tab. 6. p. 161.



Lowerbaea juncea

Capsule of three cells and three valves, the partitions from the middle of the valves.

Seeds one or two in each cell, angular, blackish.

The herb when bruised has no peculiar smell, and is totally destitute of any flavour of garlick. The flowers also are without scent.

TAB. VI. represents the *Sowerbæa juncea* of its natural size.

Fig. 1. The stamina and pistillum.

2. 2. Barren filaments.

3. Germen and style.

4. Capsule magnified, cut transversely.

5. A seed.

XVII. *An Account of the Fructification of Lycopodium denticulatum.*

*By Felix Avellar Brotero, Professor of Botany in the University
of Coimbra, F. M. L. S.*

Read July 2, 1799.

LYCOPODIUM DENTICULATUM.

L. FOLIIS imbricatis, ovatis, mucronatis, caulibus repentibus,
dichotomis ramosissimis; spicis assurgentibus, monoicis.

L. foliis bifariis, superficialibus imbricatis; furculis repentibus, floribus sparsis. *Linn. Syst. Veg.*

Muscus denticulatus et foeniculatus Dalechampii. *Grisley Vir. Lus.*
n. 1041.

Muscus terrestris Lusitanicus. *Clus. Hist. 2. p. 249.*

Idem. *J. Baub. Hist. Pl. vol. 3. p. 757.*

Muscus denticulatus minor. *Baub. Pin. p. 360.*

Lycopodioides imbricatim repens. *Dill. Musc. 462. t. 66. f. 1. A.*

Lycopode denticulé. *Lamarck Encycloped. Meth.*

GERMINATIO. *Radicula* unica, simplicissima, capillaris, uncialis, pubescens, enata prima ex hilo trihiulco, seu ex basi subtrivalvi integumentum seminis aperta. Cotyledones duæ, ex vitello evolutæ, oppositæ, obovatæ, glabræ, patentes, semilineam latæ, unam lineam

lineam longæ: scapus, medius inter vitellum intectum et cotyledones evolutas, capillaris, glaber, erectus, tres lineas longus. Paucis exactis diebus, plumula apparet bifolia, foliolis sublanco-latis, inter cotyledones decussatim oppositis; postea ad plumulæ singuli folioli basin aliud simile exoritur, atque ex istorum duorum medio tertium alterum utrinque demum progerminat, quod sensim in furculum foliatum protenditur, sicque scapus primordialis bifurcus tandem fit. Integumentum seminis cum vitello trihiulcum persistit quoad usque duo prædicti furculi sesquiunciam longitudinem adipiscantur. Decembri aut Januario in humo umbrosâ germinat.

Surculi setacei, subangulosi, substriati, repentes, dichotomi, ramossissimi, foliis tecti, tres ad sex uncias longi, biennes, triennes et ultra, æstate arescentes, autumnno humiditate revirescentes; ramis ex gemma composita axillari exortis, patentibus, aut divaricatis; radiculis ad ramorum bifurcationes solitariis, setaceis, infernè dichotomis.

Folia omnia alterna, glabra, ex pallido-viridia, sessilia, mucronata, obsoletè-decurrentia, aliqua postice ad basin gibbosiuscula, ciliato-ferrulata, denticulis minimis acutissimis (lente vitreâ conspecta). In ramulis non fructificantibus quadrifario-secunda; lateralibus, seu solo applicata patentibus, contigua, ovata, acutiuscula, plana, paulo ultra lineam unam longa, pauloque semilineam lata; superficialia ovato-lanceolata, acutiora, triplo fere minora, obliqua, laxè imbricata; in dichotomiis ad radicularum exortum unum constanter solitarium, inferum. In ramulis fructificantibus quadrifariam laxè imbricata, alia etiam majora, minora alia, ovato-lanceolata, omnibus aliis acutiora, basi concava, apice reflexo.

Ramuli fructificantes terminales, adscendentes, sæpius gemini, triplicati, s. quasi amenta. Flores axillares, solitarii, monoici.

Perichætium et calyptra in utrisque floribus nulla.

Flores masculi ad ramorum apices plurimi, ad viginti sex et ultra, inferne pauculi inter foemineos nonnullos, seu interdum cum ipsis alternantes, superioribus præcociores. Anthera axillaris, sessilis, solitaria, obtusa, ex reniformi-cordata, primum ex pallido-viridis, seu subrufa, demum saturate testacea, pistilli germine valde minor, unilocularis, bivalvis, (ut in *Callitriche vernâ*) calore, non vero humiditate verticaliter dehiscens; valvulis æqualibus, ovato-subcordatis, elastice pollen ad latera vibrantibus, diaphanis, valde porosis: grana pollinis numerosissima, ad tercenta, subæqualia, subglobosa, acutiuscula, lutescentia, colore ceræ, solida, minime neque siccitate neque in aqua dehiscencia, elastice desilientia, ad candelæ flammam a me applicata non inflammabilia.

Flores fæminei ad ramorum extremorum inferiora, aut interdum sub eorum bifurcationibus permulti, sed masculis sæpius numero minores, solitarii, axillares, sessiles. Germen ovatum, subtriangulum, obtusum, læve, nitidum, pedicello capillari minimo vix conspicuo adhærens, fossulis nonnullis, punctisque tuberculosis minimis, fuculentis, vagis instructum. Stylus nullus. Stigma: rima, seu sulcus profundus in germinis basi, qua folio incumbit, utrinque ad latus pedicelli, liquore unctuosissimo diutissime perfusus, indies largior, persistens. Ovula etsi grandefacta adultaque oleo crasso plena, quod ferè demum in vitellum solidum convertitur.

Capsula subsessilis, pedicello minimo capillari, non in baseos centro, sed hinc versus folium sito, imposita, trigona, seu conico-tricocca, obtusa, basi hinc versus folium emarginata, ex pallido-viridis, unilocularis, quadrivalvis, elastice per futuram sinûs inter semen superius et aliud oppositum rachi incumbens lateraliter dehiscens: valvulæ diaphanæ, basi coalitæ, (ad microscopium porosæ, papillo-sæ) duæ majores concavo-convexæ, margine revolutæ, ovatæ, obtusæ,

obtusæ, oppositæ; duæ aliæ triplo minores, oppositæ, majores decussantes, carinatæ, acutiusculæ. Quæ capsulæ ad ramulorum inferiora sitæ sunt, citius maturescunt ac dilabuntur.

Semina constantissime quatuor, globosa, parietibus valvularum incumbentia, hili triangularis apice ad tuberculum minimum in capsulæ fundo, quâ pedicellus definit, situm laxè applicata; tria inferiora, quartum superius ipsis impositum; inferiora duobus hili angulis lateralibus inter sese cohærent, et tertio interno angulis tribus quarti seminis superioris affiguntur; omnia elastice desiliunt. Integumentum simplex luteo-fulphureum, sub-coriaceum, (ad microscopium) scabriusculum: albumen embryonem involvens nullum, sed vitellum globosum, integumenti magnitudine: embryo, seu plantula feminalis, vix conspicitur. *Semina* plurima abortiunt; duo sæpius paulo majora, fertilia, unum aliudve ex quatuor interdum exsuccum demum evadit.

Floret autumnno, hyeme et primo vere.

Habitat ad aggeres umbrosos, subhumidos passim prope Conimbriam, ubi jam olim a celeb. Clusio observatum, et alibi in Beira et Extremadura.

Tota planta inodora et insipida est, quamvis a nonnullis leviter dulcis et astringens habita fuisset. *Semina* fertilia aquæ fundum petunt; omnia nitrosa, oleosa, fulgurantia, ut illa *Lycopodii clavati*, quibus esse viribus medicis analoga probabile est.

Linnæi opinio, qui fulgurantia semina pro polline, et furculorum gemmas in *Lycopodiis* pro pistillis et fructu habebat, jamdudum explosa. Illust. Gærtner nullas antheras, sed semina duplicis formæ in eadem stirpe *Lycopodia* sæpe ferre, atque aphroditas plantas esse contendit.

Celeb. Adanson etsi *Lycopodiis* antheras et pistilla, seu capsulas, stylo

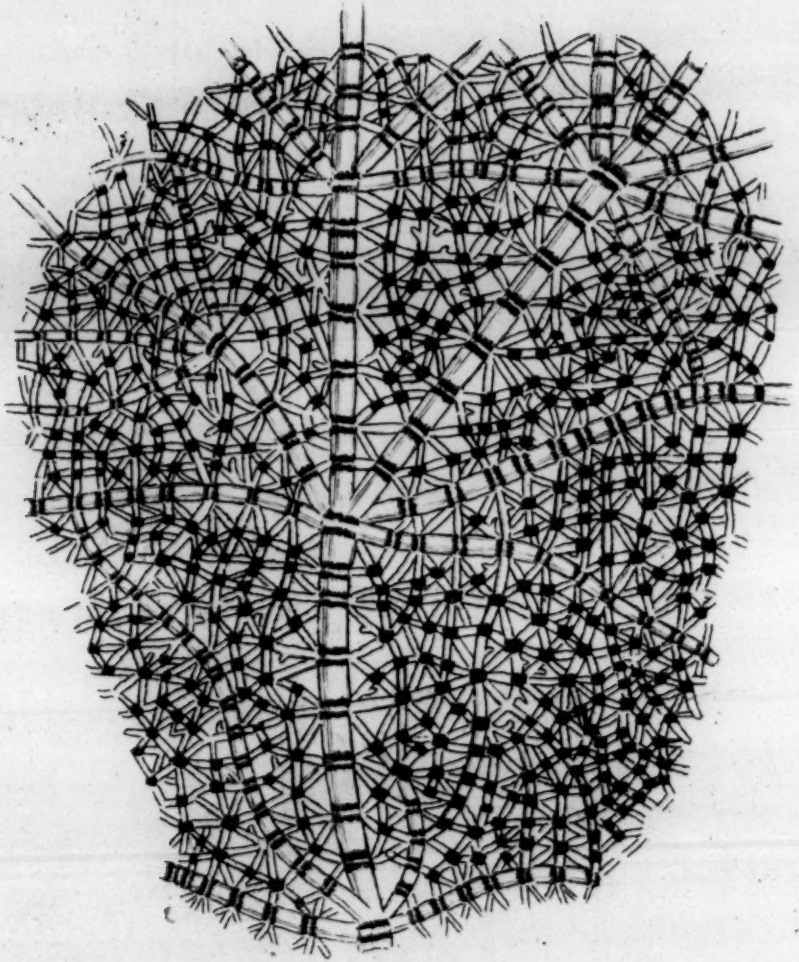
stylo stigmatique nullis, tribuat, attamen capsulas polliniferas cum feminiferis, seu fructum cum antheris confundere videtur, nam femina fulgurantia pro polline habet, ipsaque monocotyledonea existimat, quod ex nostri affinitate specificâ non admittendum censéo. Clariss. Jussæus, De Lamarck, Schreber et alii ex recentioribus Botanicis nullam inter polliniferas et ovuliferas, seu feminiferas capsulas distinctionem ex structura partium aliisque botanicis notis desumptam dederunt. Cæterum quod ad nostrum *Lycopodium denticulatum* attinet, ortus, color, tempus florendi, situs, fabrica, commercium cum fœminis clare indicant capsulas illas subreniformes, corpusculis ad tercenta plenas, verarum antherarum requisita possidere, et ad veras antheras esse referendas. Ovaria, seu pistilli germina et ovula ipsa semper longo temporis intervallo antheras et pollinis formationem præcedunt: inferiora priusquam superiora (sicuti etiam antheræ) evolvuntur et matureſcunt. Cum in omnibus vegetabilibus, etiam e perfectorum tribu, non una eademque sit organorum sexualium, stigmatis pollinisque conformatio, (nam ex. gr. in *Agyneja* stigma est foraminulum in germinis apice sexcrenatum, et in nonnullis *Orchideis*, *Contortis*, &c. pollinis granula solida sunt) nil sane mirum emarginaturas pro stigmate taliaque pollinis granula *Lycopodio* nostro a natura donari. Antheræ illæ pauculæ, quæ inferne inter prima ovaria sitæ sunt, priores pollinis granula explodunt; istorum aliqua in aerem et per ipsum ad vicinarum stirpium co-specificarum spicas, alia supra germina propria aut remotiora, alia in axillas foliorum et supra folia ipsa, unde ad ovariorum emarginaturas, ubi diu persistunt, inferiorum descendunt: tunc sperma tenuis liquoris specie, ex granulis excretum per insensibiles futurarum, seu ovarii emarginaturarum poros absorbetur, vasa ad tuberculum, seu receptaculum minimum, cui ovula adhærent, deferentia permeat, et tandem ipsa fœcundat. Non ergo imprægnationem (quæ forte nonnullis placebit)

placebit) media absorptione, ex pedicello antheræ minimo habita, spermatis, quod simul cum sapâ per spicæ rachin ad ovarii singuli pedicellum descendat, admittere opus erit; imo id permultorum feminum abortio dijudicare vetat. Nec mirum tot abortiri ovula, cum planta habitat reptetque semper in locis subumbrosis et humidis, cumque ejus folia et istorum axillæ sæpius aliquo rore conspergantur, ac tandem cum perpaucae antheræ ex superioribus debito tempore aperiantur pollenque ejaculent: huic tamen natura prospexit, spicis ascendentibus copiosisque, ovariiis permultis, antheris summo-pere polliniferis et ad spicarum apices numerosis; unde satis semper fertilium ad magnas in aggeribus nostris segetes producendas feminum superest. Fateor tamen sæpissime observasse antheras fere omnes, quæ in spicarum summitate proveniebant, eodem tempore, quo capsulæ aperiebantur propriores subtus sitæ, aperiri, pollenque perfectum explodere: capsulis istis sicut et eorum seminibus magnitudo erat naturalis, sed femina oleo crasso plena, (non autem solido vitello) integumento viridi teneroque, hilo simili, humido et sursum reverso, cui aliqua interdum granula pollinis explosa applicabantur; per pauca temporis momenta in capsula hianti manebant, nam citò ex ipsa sursum ac deorsum ad folia, aut vicinas spicas co-specificas elastice desiliebant, ubi nonnumquam in aliqua pollinis granula ejaculata incidebant. Itaque cum non verisimile sit ista tot innumera femina omnia aborta, facile crederem nonnulla sive ex propria sive vicina alia planta co-specifica granulis alicujus antheræ explosæ jam fecundata fuisse. Nonnulli fortasse hilum triangulare pro vero stigmate fument, et fecundationem ovulorum in ista planta eodem, quo in piscibus et quibusdam aliis animalibus, modo fieri contendunt, nempe per spermatis applicationem ovulis adultis, seu extra ovarium positis, maxime in eo innixi, quia femina nulla istius Lycopodii solida evadant, nisi posteaquam ex capsulis elastice desilierunt, et quia
eorum

eorum integumentum hilo trifido tridenteoque in germinatione constanter aperiatur. Quamvis autem hæc opinio non improbabilis esse videatur, attamen cum ovula medio stigmate externo ovarii, quod descripsi, fecundari possint, aliud admittere non opus est, præsertim quia in nullis feminibus usque adhuc in regno vegetabili notis fecundatio in statu integumenti proprii adulto unquam observata fuit. Quidquid vero sit, illa quatuor corpuscula in capsulis conico-tricoccis contenta esse femina, et alia in capsulis reniformi-cordatis esse pollinis granula fat ex supradictis evidenter colligi posse censeo. Quapropter clariss. Gärtneri opinio*, qui pollinis corpuscula esse granula feminalia diversæ ab aliis ejusdem stirpis feminibus formæ credit, admodum a vero distat. Nam insuper, cui bono tot feminalia granula, si nunquam ex illis novellæ plantæ prodeunt? Ad aggeres Conimbricenses autumnno et hyeme numerosas segetes Lycopodii nostri pluries observavi, nusquam tamen unum saltem ex sexcentis, quæ in germinationis statu avulsi, individuum inveni, quod ex corpusculis pro feminibus minoribus a clar. Gärtnero admissis (a me autem pro veri pollinis granulis) prodiret, imo omnia ex majoribus, sive veris feminibus, prout supra dixi de hujus nostræ stirpis germinatione agens, constantissime progerminare vidi, cum illa jam in humum putridam redacta essent, quoniam ut observavi, postquam vera officia mascula reddidere, corrugantur, marcescunt, contabescunt. Igitur probabile est Lycopodii species ad Monœciam alias, nonnullas vero ad Diœciam referendas, quod autoptis decidendum relinquo; nostrum constantissime monoicum est.

* Agmen denique claudat Lycopodium, quod sæpe in eadem stirpe duplicis formæ femina; et præter hæc, foliaceas quoque gemmas, feminibus perperam annumeratas, producit. *J. Gärtner De Fruct. et Semin. vol. 1. Intro. pag. xxv.*





Conseria umbilicata

XVIII. *Description of Conferva umbilicata, a new Plant, from
New South Wales.*

By Lieutenant Colonel Thomas Velley, F. L. S.

Read July 2, 1799.

CONFERVA UMBILICATA.

Conferva fronde dilatata filamentis reticulatis, centro radicali.

T A B. VII.

THIS singular vegetable production was discovered by accident on the stem of a large *Fucus* from New South Wales*.—After having placed the latter in water for the space of three or four days, a very fine filmy substance was observed floating close to the stem, which immediately collapsed, and was scarcely discoverable when the *Fucus* was taken out of the vessel. Upon a more minute investigation, two or three separate plants were found strongly attached to the stem; all of which, from their extreme tenuity, were in some degree torn.

The frond of the largest might be between three and four inches diameter; it probably was of greater extent in its perfect state, and seemed to favour a circular mode of growth. The base is somewhat central, and from it proceed two or three apparently

* Sent by Governor Hunter, who very laudably made a collection of plants for the purpose of promoting Natural History.

membranaceous leaves, giving the frond the form of an umbilicated *Ulva*. Under the microscope several cylindrical stems, not larger than a hair, were found to diverge suddenly in different directions, producing similar ramifications in distinct whorls at small distances, and carrying with them innumerable reticulated ramules combined together in all directions; some of which seemed in a small degree to favour a circular tendency: the whole forming a most beautiful web of cylindrical filaments, far exceeding the finest lace, and setting at defiance the utmost art of the pencil. The interstices do not retain any regular or prevailing form throughout, as they appear to do in the *Conferva reticulata*; but are united with each other in the manner above mentioned.

Two circumstances are to be observed in the structure of this plant. First, the ramules, however varied in their direction, unite with the main stems at regular joints; while the separations, or diaphragms, as they are generally called in the *Confervæ*, are evidently apparent at those points of union. Secondly, between the interstices small subacute spinules frequently appear. Hence I was induced to consider this vegetable production, however singular in its mode of growth, as a real *Conferva*. As the ramifications brought to my mind the veins of a leaf, I at first examined it under a notion of its being the skeleton of such a body, after it had been divested of its cellular substance: but as this web so greatly surpasses in tenuity any of those appearances, I conclude it could never have continued in so distinct and organized a state, if its present form had been owing to an anatomical process, which sometimes accidentally takes place in decayed leaves.

The filaments, separately viewed, were transparent, but contracted a degree of opacity at the joints. The whole plant, from the closeness of its texture, when taken in the mass, has a sombre green tint.

XIX. *Observations on the British Species of Mentha.* By James Edward Smith, M.D. F.R.S. P.L.S.

Read March 5, 1799.

NO British genus of plants, except perhaps *Conserva*, has been hitherto less understood than that of *Mentha*; either with respect to its species, and the principles upon which their distinctions ought to be founded, or the synonyms of those species in the most recent, as well as the more ancient writers. Dillenius in his edition of Ray has truly observed, that England is peculiarly fertile in mints; but he confesses, notwithstanding all he had in that edition added to those of Ray, there still remained some described by Merrett, and others observed by Buddle and Rand, which he found himself obliged to leave for future enquiry.

In entering upon this difficult disquisition, it naturally divides itself, if I may be allowed a scholastic formality, into two parts: first, it will be found necessary to consider how preceding authors have treated it; and secondly, to enquire how it may be made more intelligible in future.

I. In treating of the genus of *Bromus* in our fourth volume, I found it not requisite to go farther back than the works of Ray. In the present instance Merrett's *Pinax*, and indeed a still more ancient work, the *Phytologia Britannica* of Dr. How, published in 1650, a work which escaped my recollection in writing the paper on *Bromus*, both require to be noticed.

These publications were composed upon the plan which Ray afterwards followed. The authors enumerated every British plant, to the best of their knowledge, not indeed sufficiently discriminating truly wild from exotic species, and arranged them alphabetically under one or more denominations, taken from any author that came in their way. Their works are therefore equally deficient in system, and uniformity of nomenclature; for neither had been thought of in those days, at least in this country. Ray introduced a systematic arrangement, but was still indiscriminate in the books from which he took his synonyms, choosing, from any quarter, what best expressed the plant he meant, or probably adopting such as happened to be in the most general use. Hill and Hudson first disposed our native plants under the uniform nomenclature of one writer, Linnæus; the former indeed only as far as the genera were concerned, the latter with respect to both genera and species. How much is it to be regretted that, instead of bestowing his talents in building a system, which, however learned and ingenious, is now superseded by a more easy one, Ray did not undertake to define by words what he so well understood, the specific differences of plants! We should then have quoted him with certainty in every instance; whereas, if he should now have chanced to mistake a synonym, we are led into an error, unless we happen to know certainly the plant he must mean, and can judge for ourselves, as well as he could, of the propriety of the synonym. Fortunately such mistakes in Ray are very rare, but they sometimes occur. Hence it is necessary to observe that, though in quoting Ray, Merrett, How, or Dillenius for any plant, we are obliged to name it by the denomination of some prior writer, under which they have placed it in their books, we never answer for its being the plant intended by that writer. If we *believe* it to be so, we quote him expressly; if we certainly *know* it,

it, we quote the Herbarium or specimen on which our knowledge is founded. So in quoting Linnæus, we only answer for his own names, and by no means for any of his synonyms; for I am sorry to say he is in that department more incorrect than most other writers, even in his most accurate and ingenious *Flora Laponica*, and very much so in his laboured *Hortus Cliffortianus*. Dillenius has made many similar mistakes, and the works of Haller abound with them. How ill-advised therefore are those who copy synonyms from any author without examining them! This is a truth I have often inculcated, but it cannot be too strongly enforced. Let those who think it unimportant pursue with me the history of the British Mints.

Dr. How enumerates 8 species of *Mentha* and *Menthastrum*, including *Calamintha aquatica* and *Pulegium*. One of these, "The great curled Mint of Germany," *Mentha crispa Danica aut Germanica spinosa*, has never been supposed to be British, and is left out even by Merrett. Another is the Cat Mint, *Nepeta Cataria* of Linnæus. The 6 remaining species I find no difficulty in ascertaining, and shall quote in their proper places.

The *Pinax* of Merrett contains 11 supposed species of Mint, two of which belong to *Mentha Pulegium*, a third is *Nepeta Cataria*, another (*Calamintha aquatica*) is *Mentha arvensis*. Five of the remaining ones are marked with an asterisk as being added by himself to the list of British plants, and of these the 4 last are as unintelligible to me as to Dillenius, nor do I know how they are to be ascertained. I shall transcribe all Merrett says upon the subject.

"*Mentha odorata flore cineritio*. Five miles from Gloucester, in the way to Hereford.

"*Mentha Balsamita vel latifolia odorata*. In the way betwixt Pemsey and Lewes in Suffex. Diutissime durat odor ejus suavissimus.

"*Mentha*

"*Mentha incana foetida*."

"*Menthastrum* valde ramosum flore violaceo rubro. At Dartford in Kent."

It is most probable that all these are referable to species we are acquainted with; but the above characters are too slight to determine them by, neither would I venture to decide upon them without seeing specimens. It is not my purpose to guess at botanical enigmas, but to investigate truth by the light of facts and authentic information.

The first edition of Ray's *Synopsis* (I pass over his earlier catalogues) contains 8 real Mints including *Pulegium*, all from that excellent writer's own knowledge, and about which there is no kind of obscurity. They will be quoted in proper order hereafter.

In the 2d edition three more are added, but with less accuracy. These are *M. verticillata* n. 2, which appears to me a very doubtful species; *M. spicata* n. 5, the officinal Pepper-mint; and a verticillate mint n. 6, under which last two very distinct species are confounded, for in this instance Ray trusted to other people.

Before Dillenius published the 3d edition of Ray's *Synopsis*, botany was very assiduously and scientifically cultivated in England. The genus of *Mentha* particularly engaged the attention of Buddle, the three Dales and two Bobarts. These industrious botanists collected a great number of species and varieties, and communicated to each other every thing they found, with remarks upon the properties and characters of each, and their conjectures about the synonyms of authors. Their original specimens, preserved in the British Museum, the Sherardian Herbarium at Oxford, or in my own collection, elucidated by ample manuscript remarks, have been my guides in the study of this genus, which cannot be decyphered without them. The whole were submitted to Dillenius, who made what use he chose

chose of them in his edition of the *Synopsis*, but by no means adopted or understood them all. What he has there inserted, from these authorities or his own observation, is either marked with an asterisk or enclosed in crotchets. He has added two very bad figures, which have contributed to obscure the subject. Sherard, to whom specimens of all these plants were communicated, followed his favourite propensity in accumulating synonyms for each, but not with accurate discrimination. Whether such an undertaking may be too vast and difficult for any mind, or whether Sherard and Dillenius worked with too little caution, I know not; but, without detracting from their eminent knowledge and acuteness in other respects, I cannot but think it fortunate that the celebrated *Pinax* never appeared. Botany would then have been pursued by the indolent attention to synonyms instead of definitions, and would neither have been useful as an exercise for the mind, nor have led to the actual knowledge of Nature. As Buddle and Samuel Dale studied plants with a view to their medical qualities, it is not wonderful that they should have paid great attention to the various odours of Mints; upon which, added to the shape of the leaves and the different degrees of hairiness, their ideas of species were founded. All these however are variable circumstances, especially the smell. When Linnæus took up the subject he likewise depended on the form of the leaves, taking a farther character from the stamina being longer or shorter than the corolla, and in this Mr. Hudson and Mr. Sole have followed him. Let us investigate these methods of discrimination.

Almost every species of Mint indeed has in its original wild state a peculiar smell of its own, by which alone the *Mentha rotundifolia*, for instance, is at once known from every variety of the *sylvestris*; and the *M. arvensis*, by its smelling like blue mouldy cheese, is distinguished from other whorled mints. But many mints are capable
of

of acquiring an entirely new smell, either by accidental variation of soil, a dry situation, or some change in their constitution which we cannot understand. Thus the smell of Sweet Basil, *Ocimum*, is acquired by some, that of Orange by others, and one or two acquire a peculiarly sweet smell, which belongs also to a sweet variety of the Garden Thyme, *Thymus vulgaris*, called in Norfolk, where it is very common, Frankincense Thyme. The smell and taste of Pepper Mint, which seem natural to our well-known species so named, are shared in common with it by some others, even wild in England; and the *Mentha piperita* used in Sweden, and described by Linnæus and Bergius, is certainly a different species from ours. Indeed I am told by those who cultivate our Pepper-mint for medical purposes, that, to keep up its quality, the roots must be transplanted every three years; otherwise it degenerates into the flavour of Spear-mint, from which nevertheless it is specifically different.

The shape of the leaves, though in some instances tolerably constant, in others is found very variable both as to length and breadth. This is particularly the case in the spiked Mints. The degree of hairiness of the leaves, and in general of the whole plant, is extremely uncertain. I need scarcely say, colour is not at all to be depended on. Many mints exposed to much air and sun become altogether purple. The length of the stamina is also a variable circumstance. As all these plants have creeping roots, the seeds are rarely perfected, and even the stamina frequently prove abortive. In this case they are commonly shorter than the corolla.

The inflorescence in this and every genus has been considered by all authors as affording indubitable marks of specific distinction. The mints have been divided into spiked, capitate and verticillate. Some very striking circumstances have led me to doubt whether even these distinctions are well founded. I am very confident the same

species

species is found capitate and verticillate in the same meadow, though, I acknowledge, no intermediate varieties, by which we could trace their connexion, are in general observable; but I have seen one or two such specimens. I have ventured to mention this novel opinion in the *English Botany*, p. 448, and have conversed with several accurate botanists upon it. Most of them are so averse to it, that I cannot venture absolutely to insist upon it. The following arrangement of British Mints will therefore be founded on nearly the established principles of inflorescence, but I shall mention wherever those principles appear to me to divide a real species.

II. Having found so much difficulty in determining the species of *Mentha* by all the modes of discrimination hitherto contrived, I was soon convinced of the necessity of discovering some other principle, or of leaving the genus altogether a chaos as I found it. The experienced botanist well knows how peculiarly difficult it is to meet with certain discriminative marks between genera in very natural orders; happily it is not always equally difficult in very natural genera to trace out specific characters. On the contrary, Nature generally makes some one peculiar part, either in the herbage or flower, so various in the different species, and so constant in the same, as to afford, to a careful investigator of the subject, a very certain clue. Thus, the various hairiness of the stamina in *Orobanche*, the ribs of the calyx in *Arenaria*, the form of the stigma in *Crocus*, the absence or presence of a nectarium in *Cuscuta*, the shape of the capsule in *Fumaria* and some species of *Juncus*, and its situation in different *Saxifragæ*, the various numbers of stamina and styles in *Polygonum*, *Phytolacca*, *Cerastium*, and several other genera; all these circumstances, some of which in other instances afford generic distinctions, in the above natural genera constitute the best and most

important specific ones. If I am not too sanguine, I have met with as satisfactory a mode of determining species in *Mentha* by the calyx and flower-stalks, particularly with regard to the pubescence of those parts and its various direction. This is most peculiarly useful in the verticillate Mints, where it is most wanted. In one case we find the flower-stalk and base of the calyx invariably smooth and naked, the upper part and teeth only of the latter being rough with hairs pointing upward; in another the calyx is all over clothed with projecting horizontal hairs; in a third it is covered with hairs which point upward, and the flower-stalk with hairs that point downward. These circumstances appear to me invariable. I have examined innumerable dried as well as living specimens, I have watched their growth in different soils, always with this particular object in view, and have found no reason to alter my opinion. I do not say the hairiness of these parts never varies in degree, but even in this respect it varies much less than that of any other part of the plant, except in *M. viridis*, which is a spiked species, and it never varies in direction. The utility of this source of discrimination will best appear when we come to investigate the verticillate species. I shall therefore say no more upon it at present, but proceed to a practical illustration of the whole.

As this genus is so perfectly natural that no one can be more so, it will be best, after mentioning its essential generic character, to give an account of those particulars in which all the species agree. This will prevent useless repetitions in the separate descriptions of each.

GENERIC CHARACTER.

MENTHA. *Linn. Gen. Pl.* 291. *Juss. Gen.* 113.

DIDYNAMIA *Gymnospermia.*

Calyx quinquefidus. *Corolla* subæqualis, quadrifida; laciniâ latiore emarginatâ. *Stamina* erecta, distantia.

Charaëter Naturalis.

Radix repens, perennis. *Caules* ramosi, quadranguli, foliosi. *Folia* opposita. *Flores* verticillati, pedicellati, verticillis simplicibus, capitatis, vel spicatis. *Calyx* cylindricus, monophyllus, striatus, quinquedentatus, ferè regularis. *Corolla* infundibuliformis, calyce paulò longior, purpurascens. *Stamina* tubo inserta. *Stigma* bifidum, acutum, divaricatum. *Semina* quatuor, parva, sæpiùs abortiva.

Herba aromatica, resinoso-punctata, plerumque magis vel minùs pubescens.

SPECIES.

* *Spicatae vel capitatae.*

1. MENTHA *sylvestris.*

Horfe Mint.

M. spicis villosis subcontinuis, foliis acutis dentato-ferratis subtùs præcipuè tomentos, bracteis subulatis.

α , foliis lanceolatis.

Mentha sylvestris. Linn. *Sp. Pl.* 804. Hudf. 250 α . Hull. 125.

M. spicata β , longifolia. Linn. *Sp. Pl. ed.* 1. 576.

M. spicata α , longifolia. Gouan. *Hort.* 279.

M. longifolia. Hudf. *ed.* 1. 221. *Herb. Rose.*

M. villosa prima. *Sole Menth.* 3. t. 1.

M. n. 227. Hall. *Hist.* v. 1. 99.

M. spicis solitariis interruptis, foliis lanceolatis ferratis sessilibus.

Linn. *Hort. Cliff.* 306. n. 1. *Herb. Cliff.*

M. sylvestris, longiore folio. Baub. *Pin.* 227.

Menthastrum. Dod. *Pempt.* 96. Lob. *Ic.* 509. Ger. *em.* 684.

How. *Phyt.* 74. Merr. *Pin.* 77.

M. spicatum, folio longiore candicante. Baub. *Hist.* v. 3. p. 2.

221. Raii *Syn. ed.* 1. 79. *ed.* 2. 124. *ed.* 3. 234.

 β , foliis ovatis.

Mentha sylvestris. Fl. Dan. t. 484.

M. villosa secunda. *Sole Menth.* 5. t. 2.

M. villosa. Hull. 126.

Menthastrum. Riv. *Monop. Irr.* t. 51. f. 1.

 γ , *Mentha candicans, foliis spicis et odore vulgari fativæ similis.*

Doody in Raii *Syn. ed.* 2. 341. *Herb. Bobart.*

 δ , foliis ellipticis latis.

Mentha rotundifolia. *Sole Menth.* 9. t. 4.

M. alopecuroides. Hull. 126.

M. rotundifolia spicata altera. Linn. in *Herb. Cliff. at vix Baub.*

Pin. 227.

M. fyl-

M. sylvestris rotundiore folio. *Baub. Pin.* 227, *ex fide Herb. Baub.*
Haller.

M. hortensis secunda. *Fuchf. Hist.* 289.

Menthastrum sylvestre foliis latis. *Hort. Eyst. Æst. ord.* 7. t. 3. f. 2.

In ruderatis et paludosis. Fl. Augusto.

α and β are found in various parts of England.— γ plentiful in Kent.
Rand. Buddle in Bobart's Herbarium.— δ in Kent and Essex, but
rare. *Sole.* At Thorpe near Norwich, and in other parts of Nor-
folk.

Caules 2—4-pedales, erecti, villosi, pilis deflexis. *Folia* sessilia, supra
incana, subtus villosa, dentato-ferrata; in α lanceolato-oblonga;
in β ovata; in γ ovata, minora, magisque tomentosa; in δ ellip-
tica, latissima, inciso-ferrata. *Spicæ* terminales, paniculatæ, acu-
tiusculæ, villosæ, densæ, multifloræ, verticillis inferioribus remo-
tiusculis. *Bractææ* subulatæ, villosæ, floribus duplò longiores; in-
feriores latiores. *Pili pedicellorum* arcuè deflexi. *Calyx* parvus,
undiquè hirtus, dentibus setaceis, tubo longioribus. *Corolla* ca-
lyce duplò longior, incarnato-purpurea, extus hirsuta. *Stamina*
plerumque inclusa.

The first and second varieties of this species are well known by
the name of Horse-Mint, and are not very unfrequently to be met
with, especially the second, in moist or shady places, on the banks
of rivers, or in waste ground, orchards, farm-yards, &c. They
differ a little in the shape of their leaves, but in no other respect;
and run so much into one another, that it is by no means easy to
settle the synonyms of each. Even Mr. Sole, so studious of dif-
ferences in the species of *Mentha*, and so acute in discerning them,
esteems

esteems these to be mere varieties of each other. They have a strong smell peculiar to this species.

The third variety I have seen only in Bobart's Herbarium at Oxford, sent by Buddle, with a ticket in his own hand-writing as follows.

"M. candicans foliis spicis et odore vulgari fativæ similis, Doody in App. R. Syn. 341. I take this to be only a sweet-scented variety of the *Menthastrum spicatum*, folio longiore candicante, J. B. 3. 221. Observed by Mr. Rand plentifully in Kent, where they call it the Rough Spear-mint. Of this kind I take to be the *Menthastrum niveum Anglicum*, Park. 32."

The specimen appears to be a variety of *M. sylvestris* with smaller and shorter leaves, scarcely exceeding an inch in length. The spikes are numerous, dense, obtuse, downy, looking somewhat like those of the true *M. rotundifolia*, but I am satisfied it is not that species. In Buddle's own herbarium, in the British Museum, it is remarkable that the specimen to which this quotation of Doody is annexed, is almost exactly like that marked *Menthastrum spicatum folio longiore candicante*, J. B. my first variety of *sylvestris*, and still more closely perhaps agrees with the specimen in Mr. Rose's collection named under Mr. Hudson's authority *longifolia* of his first edition.

In the Bankian herbarium is a specimen from Switzerland of Haller's *Mentha n.* 228, which has a very sweet basil-like smell. It appears to be a small downy variety of *M. sylvestris*. I have seen nothing similar to it in England.

My fourth variety is very often taken for the *M. rotundifolia*, and Mr. Sole has so denominated it. It differs from the preceding varieties principally in the form of its leaves, which are elliptical, obtuse, and very broad. Culture makes no alteration in their shape. In other respects, after the examination of numerous wild and culti-

vated specimens, I cannot find the shadow of a specific character, nor even a difference in taste, smell, or colour.

2. *MENTHA rotundifolia.*

Round-leaved Mint.

M. spicis subhirsutis interruptis, foliis ellipticis obtusis rugosis crenatis subtus villosis, bracteis lanceolatis.

Mentha rotundifolia. *Linn. Sp. Pl.* 805. *Huds.* 251. *With.* 522. *Engl. Bot.* t. 446. *Hull.* 126.

M. crispa. *Linn. Sp. Pl. ed. 1.* 576.

M. sylvestris. *Sole Menth.* 7. t. 3.

M. n. 226. *Hall. Hist.* v. 1. 99.

Menthastrum anglicum. *Riv. Monop. Irr. t.* 51. f. 2.

M. folio rugoso, rotundiore, spontaneum, flore spicato, odore gravi. *Bauh. Hist.* v. 3. p. 2. 219. *Raii Syn. ed. 1.* 79. *ed. 2.* 124. *ed. 3.* 234. *Herb. Buddle.*

Menthastrum. *Tabern. Kreuterb.* 729.

β. *Menthastrum niveum Anglicum.* *Eob. Ic.* 510. *Ger. em.* 684.

M. spicatum folio crispo rotundiore colore partim albo, partim cinereo vel virente. *Bauh. Hist.* v. 3. p. 2. 219.

M. cinereum vel niveum Anglicum, variegatis foliis. *Hort. Eyst.* *Æst. ord.* 7. t. 3. f. 2; too large and luxuriant.

In rudèratis humidis, et paludosis. Fl. Augusto, Septembri.

By the river side at Lydbrook near Ross, Herefordshire, also in Essex. *Ray.* Near Hally, Kent, plentifully. *Doody.* In Hornsey and Harefield churchyards. *Blackstone.* Near Saltburn, Yorkshire,

shire, by the sea, in a dry sandy place; Mr. Robson. *With.* On the edge of an old moat at Shingham, Norfolk. *Rev. Mr. Forby.* β is common in gardens.

Caules 2—3-pedales, erecti, pilosi seu villosi, pilis subdeflexis. *Folia* sessilia, elliptico-subrotunda, rugosa, supra subpilosa, subtus villosa, acutè crenata; inferiora elliptico-oblonga; superiora minora, inciso-ferrata. *Spicae* paniculatae, obtusiusculae, hirsutae, interruptae, verticillis omnibus ferè remotiusculis. *Bracteae* lanceolatae, hirsutae, floribus duplò longiores, saepiùs deflexae; inferiores ovatae. *Pili pedicellorum* deflexi. *Calyx* parvus, campanulatus, undique hirtus, dentibus lanceolatis, longitudine tubi. *Corolla* ferè praecedentis. *Stamina* exserta. *Odor* totius herbæ acris et ingratus.

This species is readily distinguished by its smell from every variety of *M. sylvestris*, nor has it been observed to alter in that or any other respect, except the variegation of its leaves, which in the garden variety are strikingly blotched and striped with white; sometimes they assume that colour entirely. It is always a much less hoary plant than *M. sylvestris*; the leaves are constantly more or less elliptical, and frequently almost round. The more interrupted spikes, broad bractæ, shorter teeth of the calyx, and long projecting stamina, which last appear to be invariable, serve also to distinguish *M. rotundifolia*. Nevertheless it is not easy to give a specific character which will always enable a student to know it from the former species, without adverting to its very peculiar acrid and disagreeable smell; accompanied by a degree of viscosity when touched, first pointed out to me by the Rev. Mr. Forby.

Mr. Sole esteems this one of the most valuable Mints for medical purposes, and has found it very efficacious in many cases of nervous debility.

3. *MENTHA viridis*.

Spear Mint.

M. spicis interruptis, foliis sessilibus lanceolatis acutis nudis, bracteis fetaceis dentibusque calycinis subhirsutis.

Mentha viridis. Linn. *Sp. Pl.* 804. Hudf. 250. With. 521. Hull. 126. Woodv. *Med. Bot.* t. 170. *Sole Menth.* II. t. 5.

M. spicata α , *viridis.* Linn. *Sp. Pl. ed.* 1. 576.

M. n. 229. Hall. *Hist.* v. 1. 100.

Mentha. Camer. *Epit.* 477.

M. Romana officinarum, five præstantior angustifolia. Lob. *Ic.* 507. *Herb. Buddle.*

M. fativa, herba. *Pharmac. Lond.*

β , *M. angustifolia spicata.* How. *Phyt.* 74. Raii *Syn. ed.* 1. 79.

M. angustifolia spicata glabra, folio rugosiore, odore graviore. Raii *Syn. ed.* 2. 123. *ed.* 3. 233. *Herb. Sherard.*

M. spicata nostras, Cardiacæ fativæ formâ et odore æmula, folio rugosiore. Pluk. *Mant.* 129.

Mentha. Camer. *Epit.* 477. *benè.*

γ , *M. spicata angustifolia glabra, spicâ latiore.* Dill. in Raii *Syn.* 233. Dale in *Herb. Sherard.*

M. sylvestris, longioribus, nigrioribus, et minùs incanis foliis. Baub. *Pin.* 227. *Sherard.*

δ , *M. spicata glabra latiore folio.* Dill. in Raii *Syn.* 234. Dale in *Herb. Sherard.*

In palustribus. Fl. Augusto.

Near Exmouth, Devonshire, and on the banks of the Thames.

Hudson. On a common between Glastenbury and Wells, also in a meadow 4 miles from Bath, and various places by the side of the Avon between Bath and Kelston. *Mr. Sole.* β found by Mr. Dale by the river side at Bocking Essex. *Ray, and Herb. Sherard.* On the river Medway near Maidstone, Kent. *Plukenet.* At Babergh near Norwich. *Mr. Pitchford.* γ in a meadow at Bocking, Essex. *Dillenius, and Dale in Herb. Sherard.* δ in a meadow by Manwood bridge, on the right hand of the road from Mersey-island to Colchester. *Dillenius, and Dale in Herb. Sherard.*

Caules 2—3-pedales, erecti, glabri, ramosi. *Folia* sessilia, lanceolata, acuta, ferrata, glabra, quandoque subtus subhirsuta; in β , γ et δ latiora et breviora, magisque aliquantulum rugosa. *Spicae* paniculatae, elongatae, acutae, verticillis ferè omnibus remotiusculis. *Bractæa* setaceae, floribus duplò longiores, magis vel minùs ciliatae; inferiores subindè lanceolatae. *Pedicelli* omninò glabri. *Calyx* sulcatus, in α glaber, in β , γ et δ dentibus ciliatis, pilis longitudine variis. *Corolla* gracilis, purpurea, glabra. *Stamina* longitudine varia.

The common Spear-mint of the gardens was not reckoned among our wild plants by either Ray or Dillenius. Mr. Hudson however admits it, and the authority of Mr. Sole confirms his opinion. It is distinguished from the other spiked Mints by its lanceolate, pointed, and perfectly smooth leaves. Its flower-stalks and tube of the calyx are also quite smooth, though the teeth of the latter are not always free from hairiness; and the bractæa are generally ciliated. This is our first variety, the real *Mentha viridis* of the Linnæan herbarium and of all authors.

Our 2d 3d and 4th varieties have been enveloped in great obscurity, probably

probably from Ray's having so strongly insisted upon the first of them being distinct from the garden Spear-mint. Hence Hudson was induced to separate them from that, and, on account of their hairy spikes perhaps, to refer them to his *villosa*, our *sylvestris*. I am convinced the constant nakedness of their flower-stalks and base of the calyx, how hairy soever the teeth may be, is a decisive mark of their having no affinity to *sylvestris* or *rotundifolia*, but, on the contrary, evinces their belonging to the *viridis*, with which their general habit and structure altogether agree. They only differ from it in having a stronger and less grateful smell; their leaves are more rugose, rather broader, and generally shorter; their bractæ perhaps are not quite so setaceous as in the *viridis*, but all these circumstances vary. With respect to their differences from each other, nothing can be more slight; nor should I have believed that any botanist would have made them different species, had I not examined the authentic specimens of Dale in Buddle's and Sherard's collections. Of these my variety γ has the most hairy spike, the teeth of the calyx and the bractæ being fringed with long white hairs. The leaves are also a little hairy beneath. It is not easy to understand why Dillenius defines this "*spica latiore*." δ has shorter and rather broader leaves, and the hairs on the bractæ and calyx are shorter. β , the most common variety, has broader leaves, with a less hairy spike.

I cannot conclude this account of *M. viridis* without noticing one more variety of that species, though it has not yet been observed wild in Great Britain. This differs from the foregoing chiefly in having very broad ovate leaves, deeply and sharply serrated, more or less crisped or curled about the edges. The bractæ and calyx-teeth are fringed with short hairs, and the former are broader than is usual in the other varieties, so that they might be termed linear-lanceolate. This is the—

Mentha floribus spicatis, foliis cordatis dentatis undulatis sessilibus. Linn. Hort. Cliff. 306. n. 3. Herb. Cliff. but the synonyms there quoted belong to *M. crispa* of Linnæus, a most distinct species.

Another specimen with shorter and rounder leaves is in the Clifortian herbarium marked "*Mentha crispa verticillata C. Baub. Pin.*" which certainly it cannot be. This specimen however is not alluded to in the *Hortus Clifortianus*.

I have in my possession two specimens of this plant from Miller's herbarium, communicated to him by Houston, who gathered them in the Leyden garden in 1728, and has affixed to them a ticket, in his own hand-writing, containing four synonyms, every one of which, I verily believe, belongs to a different species, and not one of them to the plant in question! With all these synonyms it is however distinguished in Boerhaave's *Hort. Lugd. Bat.* 185, n. 3. * and a fifth is there superadded which belongs to still another species different from all the rest. Such extreme confusion is rare, even in the history of *Menthae*! It happens that one of these synonyms, *M. rotundifolia rubra, Aurantii odore, Moris.* v. 3. 369. belongs to Mr. Sole's *M. odorata*, commonly called in our gardens Orange Mint; and the most curious circumstance of all is, that Miller, in the 8th edition of his Dictionary, n. 9, meaning to describe this Orange Mint by the name of *M. rubra*, and happening to have before him the two specimens now in my possession, with this erroneous synonym of Morison annexed, fabricated from them his character and description; consequently what he has said by no means accords with the plant implied by his latin as well as english name, and which I have no doubt was what he had in his garden.

* These synonyms were copied by Houston from Boerhaave's work, as appears by an error of the press which he has retained, in citing John Bauhin, 318 instead of 218.

4. *MENTHA piperita.*

Pepper Mint.

M. spicis obtusis infernè interruptis, foliis petiolatis subovatis glabriusculis, calyce basi glaberrimo.

α, foliis ovato-lanceolatis.

Mentha piperita. *Huds.* 251. *With.* 523, var. 2. *Woodv. Med. Bot. t.* 169.

M. piperita officinalis. *Sole Menth.* 15. t. 7.

M. piperitis, herba. *Pharmac. Lond.*

M. officinalis. *Hull.* 127.

M. aquatica nigricans, fervido sapore. *Herb. Buddle.*

Eales' Pepper-mint. *Pet. H. Brit. t.* 31. f. 10.

β, spicis abbreviatis, foliis ovatis.

Mentha piperita. *Hull.* 127.

M. piperita vulgaris. *Sole Menth.* 19. t. 8.

M. spicis brevioribus et habitioribus, foliis Menthæ fuscæ, sapore fervido Piperis. *Raii Syn. ed.* 2. 124. *ed.* 3. 234. t. 10. f. 2.

M. fervida nigricans, brevior folio et spicâ. *Herb. Sherard.*

M. aquatica sive Sisymbrium. *Baub. Hist. v.* 3. p. 2. 223.

γ, foliis cordato-ovatis.

M. piperita sylvestris. *Sole Menth.* 53. t. 24.

M. hircina. *Hull.* 127.

In aquosis. Fl. Augusto, Septembri.

α in Hertfordshire. *Dr. Eales.* In a swampy place on Lansdown, near Bath, called the Wells; also by the side of the Avon in

Newton-mead. *Mr. Sole.* In a rivulet in Bonfall dale near Matlock, 1790. β in Essex. *Dale.* By Wandfor (Wandsworth) river. *Herb. Sherard.* In various watery places about Bath, and between Wells and Glastenbury; also in Chiltern-bottom, Wilts. *Mr. Sole.* γ in a swampy place at Lyncomb Spa, and various other wet places about Bath. *Mr. Sole.* In a little peninsula on the south-west side of Saham meer near Watton, Norfolk, observed by Mr. Crowe and myself in 1797.

Caules erectiusculi, 2—3-pedales, (in γ 4-pedales,) ramosi, purpurascens, subhirsuti, pilis recurvis. *Folia* omnia petiolata, ovata, acutiuscula, ferrata, atro-viridia, supra glabriuscula, subtus pallidiora magisque hirsuta, venis albidis vel purpurascens; in α angustiora et ferè lanceolata; in β breviora et subelliptica; in γ latiora, cordato-ovata, sæpius glabra. *Spicæ* terminales, solitariae, obtusiusculæ, infernè interruptæ, verticillo infimo (in α et γ) remotissimo, pedunculato; in β abbreviatæ, obtusiores, et ferè capitatæ. *Bractæ* lanceolatæ, ciliatæ. *Pedicelli* vel omninò glabri, vel supernè hirsuti, pilis raris recurvis. *Calyx* fulcatus, gracilis, glanduloso-punctatus, basi omninò denudatus et glaberrimus, dentibus atropurpureis, ciliatis, quandoque (in γ) apicem versus undiquè hirsutus, pilis adscendentibus. *Corolla* purpurascens. *Stamina* inclusa. *Odor* pungens, subcamphoratus; *sapor* aromaticus, fervidus, amaricans; in γ virosus et ingratus.

British botanists have long been in great perplexity concerning the synonyms of the common garden pepper-mint, so valuable for its medicinal properties. No one had however suspected that it was not the *Mentha piperita* of Linnæus, till his herbarium arrived amongst us. His original specimen there preserved is indeed the pepper-mint of the north

north of Europe, well described by Bergius in his *Materia Medica*, but quite distinct from ours, from which it may at once be known by its very hairy flower-stalks and calyx. It is merely a variety of the *M. hirsuta* of Linnæus with the flavour of pepper-mint, of which I shall presently mention another instance; and this being the case, I beg leave to retain the name *piperita* for the original Pepper-mint of Ray. Of this there are two varieties, my α and β , distinguished as species by Mr. Sole, but by cultivating the living specimens with which he has favoured me, and observing various others in a dried state, I am persuaded they cannot be specifically distinct. The old authors supposed them to be one and the same, as we learn from the collections of Buddle and Sherard; by which also we ascertain with precision the synonyms of Ray and Dillenius. A Dr. Eales appears to have been the discoverer of this valuable plant, and he seems to have first gathered the long-spiked narrow-leaved kind, supposed to be of the best quality. A ticket is annexed in Sherard's herbarium to the capitate variety, which asserts that "Ray judged this to be the *M. aquatica* sive *Sisymbrium* of John Bauhin, and compared its scent to Penny-royal." I think the writer of this ticket mistook the plant Ray meant, which is the common *hirsuta* of Linnæus; but nevertheless it seems very probable, from John Bauhin's figure and description, that our capitate pepper-mint may be what the latter intended. He says indeed nothing about its calyx, but he describes and figures the *M. hirsuta* in the next chapter, expressly mentioning the dense hairiness of the calyx in that species.

No writer before Mr. Sole seems to have noticed my third variety, γ . It is a larger plant in every respect than the others, with broad almost heart-shaped leaves, and long thick spikes. Its flavour is that of the garden pepper-mint, but much less agreeable. It varies in degree of hairiness; even the upper part of the tube of the calyx is occasionally

casionally hairy, though never the lower part; the upper side of the leaves in general is quite smooth and rather shining. I have not hitherto observed it to alter much by culture, even in a dry soil, but considering the changes to which *M. piperita* is certainly liable, I can discover nothing on which to found a specific difference between them.

5. MENTHA odorata.

Bergamot Mint.

M. spicis capitatis, foliis petiolatis cordatis utrinque nudis, calyce undique glaberrimo.

Mentha odorata. Sole Menth. 21. t. 9.

M. rubra. Mill. Dict. descr. erronea.

M. rotundifolia rubra, aurantii odore, (rotundifolia spicata, altera C. B.) Moris. v. 3. 369. sect. II. t. 6. f. 3, glabra.

In aquosis rariis. Fl. Julio, Augusto.

Very common by the sides of rivers and brooks in Cheshire, especially about Aston house; Mrs. Walmsley: also in a small brook or ditch near Capel-Carey, between Llanroost and Llanberrys, North Wales. *Mr. Sole.*

Herba tota glaberrima, rubicunda. Caules bipedales, erecti, ramosissimi. Folia petiolata, late cordata, obtusiuscula, serrata. Spicae terminales, brevissimae, capitatae, obtusae, densae, verticillo infimo remoto, axillari, subpedunculato. Bractea fetaceae, omnino glabrae. Pedicelli teretes, glaberrimi, atro-purpurei. Calyx gracilis, fulcatus, glanduloso-punctatus, atro-purpureus, tubo dentibusque omnino glaberrimis. Stamina inclusa. Odor aurantiacus, ferè Monardæ didymæ.

This

This appears to me a very distinct species, constant in the broad heart-shaped form of its leaves, orange-like scent, and invariable smoothness of the whole plant, even the teeth of the calyx. In the form of that part it most nearly approaches to *M. piperita*. Mr. Sole considers it as constituting one species with Dillenius's *Mentha Symbrium dicta hirsuta*, glomerulis ac foliis minoribus ac rotundioribus, *Raii Syn. ed. 3. 233. t. 10. f. 1*; and Morison seems to have been of a similar opinion, from the hairy figure he has annexed to his proper smooth one. I have not observed a specimen of Dillenius's plant in any herbarium; but his description, notwithstanding the orange scent, seems to express a variety of *M. hirsuta*, to which his figure unquestionably belongs; and from the place of growth it should seem likely that Merrett's *M. balsamita vel latifolia odorata* might be the same with that; yet the epithet *latifolia* seems rather more proper for our plant than that of Dillenius. However this may be, I am certain *M. odorata* can never be a variety of *hirsuta*; neither is it the *aquatica* of Linnæus, though some part of his description agrees with it. His expression "planta non hirta" seems peculiarly expressive of it, but the stamina being constantly shorter than the corolla has always been an objection. What his *aquatica* really is will be explained hereafter.

6. *MENTHA hirsuta.*

Hairy Water Mint.

M. spicis capitatis, foliis petiolatis ovatis, calyce undique hirsuto, pedicellis retrorsum hispida.

α, *Mentha hirsuta.* *Linn. Mant. 81. With. 522. Hudf. ed. 1. 223.*

Engl. Bot. t. 447. Hull. 127.

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C c

M. aqua-

- M. aquatica.* *Huds.* 252, α et β .
M. aquatica major. *Sole Menth.* 25. t. 11; & minor, *ibid.* 23. t. 10.
M. aquatica feu *Sisymbrium.* *How. Phyt.* 74. *Merr. Pin.* 76. *Raii Syn. ed. 1.* 78. *ed. 2.* 123. *ed. 3.* 233. *Ger. em.* 684. *Herb. Buddle.*
M. floribus capitatis, foliis ovatis ferratis petiolatis. *Linn. Hort. Cliff.* 306. n. 4. *Herb. Cliff.*
M. rotundifolia palustris. *Moris. sect. 11. t. 7. f. 6.*
M. aquatica five *Sisymbrium hirsutius.* *Baub. Hist. v. 3. p. 2. 224.* *Herb. Buddle.*
M. palustris spicata. *Riv. Monop. Irr. t. 49.*
Sisymbrium hirsutum. *Raii Syn. ed. 2.* 341. *ed. 3.* 233. *Herb. Buddle.*
S. hirsutum, folio angustiore et acutiore, minimè ramosum,
D. Rand. Herb. Buddle.
S. sylvestre. *Dalech. Hist.* 677.
Origanum vulgare. *Fl. Dan. t. 638!*
 β , *Mentha Sisymbrium dicta hirsuta, glomerulis ac foliis minoribus ac rotundioribus.* *Dill. in Raii Syn. 233. t. 10. f. 1.*
 γ , *M. piperita.* *Linn. Sp. Pl.* 805. *Herb. Linn. Berg. Mat. Med.* 516.
M. aquatica five *Sisymbrium.* *Baub. Hist. v. 3. p. 2. 223?* See *M. piperita.*
 δ , *M. palustris.* *Sole Menth.* 13. t. 6.
M. aquatica. *Milk Dict. ed. 8. n. 5.*
M. aquatica, folio oblongo viridi glabro, saporis fervidissimi. *Herb. Buddle. et Herb. Bobart.*

Menthastri

Menthastrum aquaticum genus hirsutum, spicâ latiore. *Raii Syn. ed. 1. 79. ed. 2. 124. ed. 3. 234. Baub. Hist. v. 3. p. 2. 222. Herb. Buddle.*

Menthastrum minus spicatum Lobelii. *Dalech. Hist. 674. How. Phyt. 74.*

M. minus. *Ger. em. 685.*

Calamintha tertia Dioscoridis, *menthastrifolia* aquatica hirsuta. *Lob. Ic. 510. Dill. in Herb. Sherard.*

ε, *Mentha paludosa.* *Sole Menth. 49. t. 22.*

In aquosis. Fl. Augusto, Septembri.

α, very common in watery places.—β, in the parish of East Borne, Suffex, in the road to Pevensey. *Dill.*—γ, a native of England. *Herb. Banks.*—δ, near Bocking. *Dale.* Somersetshire. *Mr. Sole.* In a little peninsula on the south-west side of Saham meer near Watton, Norfolk, along with *M. piperita* γ.—ε, in Holt-fen at Streatham, near Ely; also in a rivulet by the side of Awdry-causeway, near Hadingham in the Isle of Ely. *Mr. Sole.*

Herba tota magis vel minus hirsuta, sæpe purpurascens, odore forti, variabili. *Caules* erecti, ramosi. *Folia* petiolata, ovata, ferrata, subtus pallidiora. *Spicæ* terminales, breves, capitatae, obtusæ, verticillis infimis plerumque remotissimis, axillaribus, pedunculatis; in δ longiores, cylindraceæ; in ε interruptæ, verticillis plurimis axillaribus, omnibus sessilibus. *Bractæ* sæpius lanceolatae, hirsutæ. *Pedicelli* undique hirsutissimi, pilis reflexis, albis, subinde arctè depressis. *Calyx* tubulosus, fulcatus, purpurascens, glanduloso-punctatus, undique hirsutus, pilis sursum curvatis, longitudine variis. *Corolla* purpurascens, extus hirsutus. *Stamina* longitudine varia, in α et β exserta.

Under the first variety of this species I comprehend every thing that has been taken in England, and indeed most other countries, for *M. aquatica* and *M. hirsuta* of Linnæus; the editor of *Fl. Dan.* t. 638 being not less singular in naming it *Origanum vulgare*, than he is in calling *Ballota nigra*, t. 673, *Mentha aquatica*. It varies greatly in luxuriance, degree of hairiness, and colour of the stem and foliage; but every difference in these respects is so manifestly owing to a greater or less degree of moisture, or of exposure to light, that among all the synonyms I have quoted, I can find no distinction permanent or intelligible enough to characterize even a separate variety, much less a species. What I have marked β is so distinguished only in deference to Dillenius, and more with respect to the sweet smell he attributes to it, than to any thing in its form. I have not been so fortunate as to find this variety in any old herbarium, as has been already observed under *M. odorata*.

γ differs but little in form from the common *M. hirsuta*, except in being rather more slender, of a paler hue, and the leaves somewhat less hairy. Its principal difference consists in its Pepper-mint flavour. This is the *M. piperita* of Linnæus and Bergius, cultivated in the north of Europe for Pepper-mint. Linnæus's specimen is from the Upsal garden, and has the flavour of our *M. piperita* very strong. This circumstance led him to consider it as the plant of Ray and Dillenius. I have seen British specimens exactly agreeing with it in appearance, but do not recollect to have found the same flavour in any wild one. If the *M. aquatica* sive *Sisymbrium* of John Bauhin be not our *M. piperita* β , it is this *piperita* of Linnæus; but that point must remain in doubt, for want of a description of the calyx. In this variety the stamina are shorter than the corolla, at least in the Linnæan specimen; in α and β they are longer.

δ is a very curious variety, for I cannot consider it as a species, though

though strikingly distinguished by its inflorescence, the *capitulum* being lengthened out into a leafless spike of several whorls, more or less crowded together. The lowermost whorl is generally axillary and pedunculated, and sometimes is also elongated into a little spike. Buddle appears to have been the discoverer of this plant in England. He called it *M. aquatica, folio oblongo viridi glabro, saporis fervidissimi*; and it exists so marked in his herbarium. There is a specimen of the same in Bobart's collection, sent by Buddle, with a ticket of his own writing, consisting of the character just mentioned and the following remarks:

"Hæc est, ex sententiâ D. Dale, Menthastris aquatici genus hirsutum spicâ latiore, J. B. 3. 222. I desire you and your lady to taste of this, and after some little time chewing, you will find it very hot. The whole face of the plant is different from Dr. Eale's Peppermint."

This old specimen still tastes of Pepper-mint, in which, as well as every external character, it agrees with those I gathered, in company with Mr. Crowe, at Saham meer. Buddle is wrong in denominating it "*folio glabro*," for the leaves in his own specimen are by no means smooth on either side. Beneath they are paler, and considerably hairy. The calyx and flower-stalks precisely agree with those of the foregoing and following varieties. Mr. Sole's specimens very nearly accord with mine, except in having only the usual smell of *M. hirsuta*. I believe all the other synonyms above quoted are correct, though I had once great doubts concerning the figure in Lobel, Dalechamp and Gerarde, the corolla being there represented with a concave upper-lip. It actually assumes that form in some states of the flower, both in this and other Mints; and an accurate comparison of specimens with these old cuts has removed my doubts. *M. palustris folio oblongo, Moris. sect. II. t. 7. f. 4*, in which

also the corolla is drawn galeated, may belong to this variety, or to the next; but I would not venture to quote it, not having observed the original specimen in Bobart's herbarium.

The remaining variety ϵ is reckoned by Mr. Sole among the verticillate species, and indeed the living plants with which he favoured me proved truly verticillate, all the whorls being axillary, and the stem terminating in leaves; that is to say, it became exactly *M. sativa*. A dried specimen however, communicated also by Mr. Sole, has the upper whorls clustered together, with very small leaves accompanying them, and the stem terminates in a blunt head of flowers, as in his *tab.* 22. This only shews how nearly the capitate Mints are allied to the verticillate; and I have another example of the same kind in the *M. aquatica* of the Linnæan herbarium, upon which, though I have found no exactly parallel specimen wild in England, I beg here to offer a few remarks.

The original specimen of *M. aquatica*, which Linnæus described, is really a verticillate Mint. The main stem has 10 whorls, 7 of them axillary, and the leaves that accompany these are much longer than the flowers. The 3 uppermost whorls more closely approach each other, and are accompanied by leaves so much smaller than the rest, that the whole has a capitate appearance. This description is applicable also to the 5 lateral branches of the same specimen, and will be found to accord with the short account in *Spec. Plant.* Yet Linnæus is scarcely correct in saying "planta non hirta." The upper leaves at least are clothed with short close-pressed hairs. The branches and calyx are also hairy. The flower-stalks are less so than is usual in *M. hirsuta* or in *M. sativa*, but they are furnished sufficiently with little reflexed bristles to decide the specimen to belong to one or other of those species; I hardly know which, for I really believe them not to be distinct, and that this *M. aquatica* of Linnæus,

Linnaeus, and *M. paludosa* of Mr. Sole, are the connecting links between the other varieties. In the Sherardian herbarium is a specimen marked *M. palustris verticillata*, *Cat. Giff.* p. 168, I believe by Dillenius himself, with a quotation of Rivinus, *tab.* 48. *f.* 2, of the propriety of which I am very doubtful. This specimen is closely allied to that of *M. aquatica* I have just been describing. It is all over hairy in some degree, but not strikingly so. The calyx and flower-stalks are exactly as in the usual *M. hirsuta*. The whorls are 6 in number, of which the 3 or 4 uppermost are approximate, but the terminal one is small, so that it could never be called a capitate specimen. It is very tall, $2\frac{1}{2}$ feet, with long runners from the lower part.

Hence it appears that *M. aquatica* is no longer to be considered as a distinct species. If the foregoing remarks should appear long and tedious, the obscurity of the subject, and the great uncertainty which all botanists have so long been in, concerning the species in question, must form my apology.

** *Verticillatae*.

7. *MENTHA fativa*.

Hairy Whorled Mint.

M. floribus verticillatis, caule erecto, foliis ovatis, calyce undique hirsuto, pedicellis retrorsum hispida.

α, *Mentha fativa*. *Linn. Sp. Pl.* 805, (exclusis synonymis). *Huds.* 253. *Engl. Bot. t.* 448.

M. verticillata. *Linn. Syst. Nat. ed.* 10. 1099. *Huds. ed.* 1. 222.

M. rivalis β, γ et δ, (nec α), Sole Menth. 45.

M. ver-

M. verticillatæ varietas, hirsutiè foliorum discrepans. *Raii Syn. ed. 3. 232. ed. 2. 124. 6. Herb. Bobart.*

M. Sifymbriæ facie et odore, hirsuta et verticillata, D. Rand. *Herb. Buddle.*

Calamenthæ arvensi verticillatæ similis, sed multò elatior. *Herb. Buddle.*

β , *Mentha aquatica* verticillata glabra, rotundiore folio. *Dill. in Herb. Sherard.*

γ , *M. verticillata* minima, odore fragrantissimo. *Herb. Buddle*; sub *M. aquaticâ* exiguâ, *Dill. in Raii Syn. 232.*

M. austriaca. *Jacq. Austr. t. 430?*

In aquosis et palustribus. Fl. Septembri.

α , about rivulets on the side of Shotover hill near Oxford, Mr. Tilleman Bobart. *Herb. Bobart.* On the banks of the river Lea, near Hackney. *Mr. Edward Forster.* At Saham in Norfolk, and in many other places.— β , in a ditch on the left hand of Chalk's-green, going from Braintree to Leez house. *Dillenius.*— γ , found by Mr. Buddle, in company with Mr. Francis Dale sen. by the side of the new river near the upper end of Stoke Newington. *Herb. Sherard.* On Skoulton common near Hingham, Norfolk, but with only the usual smell of variety α .

Habitus, pubescentia, figura foliorum, et color variabilis, omninò *Menthæ hirsutæ*. Differt tantùm floribus omnibus verticillatis, axillaribus. Verticilli inferiores sæpiùs pedunculati sunt.

I can give no description of this Mint which will not be a repetition

tion of the foregoing, except that the flowers are all whorled. With respect to the hairiness, the form of the leaves, the pale green or purple colour, and in general the smell, there is no difference. I have parallel varieties of both in all these particulars, except indeed that I have never found the Pepper-mint flavour in any variety of *M. sativa*; but I have an instance of the sweet smell of *sativa* var. γ in an old specimen of *M. hirsuta* in my possession. This however is of small importance. In the calyx and flower-stalk they accord precisely. The hairs which entirely clothe the former are curved upwards, those which cover the latter are either curved backwards, or closely pressed to the stalk in that direction. This circumstance will be found a certain clue to distinguish all the varieties of this plant from every other whorled mint. Without attention to it there is no possibility of determining them. The stamina are either longer or shorter than the corolla, which is externally hairy. Sometimes the tube has hairs in its orifice.

It is as impossible to mark every fleeting variation in this Mint as in the common capitate *hirsuta*. β , collected by Dillenius, and preserved in the herbarium of Sherard, is a lax broad smoothish-leaved variety, the six upper whorls of which have very small leaves accompanying them; a circumstance which occurs in some varieties of Mr. Sole's *M. gracilis*, and shows an approach to the spiked mints. The calyx is duly hairy, and the flower-stalks clothed with reflexed hairs, though less thickly set than usual.

γ is the Mint that was mistaken for the *exigua* of Linnæus, whose history is to be found in the third volume of our Transactions. I had not, when that paper was written, discovered the importance of the pubescence upon the calyx and flower-stalk of this genus, or I should not have assented to the possibility of Buddle's plant being the *gentilis*: neither did I sufficiently attend to the old authors to which

it is referred. I now perceive the impossibility of deciding whether it may or may not be the *M. aquatica exigua* of Tragus; but I think his figure, as well as that of Lobel, much more like *arvensis*, and the figure in Fuchsius, *p.* 291, is most probably *gracilis*. Dillenius therefore has been too heedless in his selection of synonyms here as in many other instances. The specimens he had in contemplation are in the Sherardian collection; and as his error has caused much trouble to following botanists, they merit a particular description.

In the first place we find the *M. gracilis* (*M. gentilis* Engl. Bot. *t.* 449), with a ticket marked, in the hand of Dillenius if I mistake not, "*M. verticillata glabra, odore Menthæ sativæ.*"—It must be remembered that by *M. sativa* he means the Linnæan *viridis*. To this Sherard has added: "*M. hortensis quarta. Dod. Angl. 245. M. angustifolia glabra, odore Menihæ spicata, D. Dale.* In the hop-ground at Bocking plentifully."

In the same sheet of paper with this is Buddle's and Francis Dale's plant, the small *sativa*, the leaves of which are not smooth. It is inscribed "found by Mr. Buddle in company with Mr. Francis Dale sen. by the side of the new river near the upper end of Stoke Newington."

With them, in the same paper, is a third set of 3 specimens pasted on one sheet, marked, "observed by Mr. Francis Dale jun. by the brook down Lordship-lane near Stoke Newington." This has nearly smooth leaves, and does not materially differ from the first specimen in this sheet, *gracilis*. The calyx is only rather more constricted.

By the remark of Dillenius in the Synopsis, "*foliis glabris et angustioribus à priori (M. arvensi) differt,*" it appears beyond a doubt the plant he intended in that article, *p.* 232. *n.* 2, was this *gracilis*, with which he confounded Buddle's specimen. No one would be justified in supposing a man of Dillenius's character and merit could
make

make such a mistake, if these specimens did not prove it. Consequently the article in question must have been still involved in impenetrable obscurity without them.

I have only to add, in conclusion of this account of *M. sativa* γ, that Mr. Crowe and myself observed upon Skoulton common, Norfolk, great plenty of a variety very closely agreeing with this sweet-scented specimen of Buddle, except in smell, for ours has merely the usual scent of *M. sativa*, nor has culture in dry or wet ground altered it. The figure and description of Jacquin's *M. austriaca* come very near this. The leaves are occasionally of a dark shining green, but that is accidental.

Perhaps some apology is necessary for the trivial name *sativa*, as applied to a Mint which is never cultivated. I can only say the specific names of *Menthæ* in general are very bad and inexpressive. Few persons would prefer *verticillata*, the original denomination of this plant in Linnæus. He seems to have been aware of its impropriety; and the wrong synonyms in *Sp. Plant.* which he copied from the specimen sent him by Miller, belonging to the Mint usually called *sativa*, and which is really cultivated in gardens, probably led him to adopt that name. I have more especially thought it not worth altering, as the species will perhaps not be kept distinct from *hirsuta*.

8. *MENTHA acutifolia*.

Fragrant sharp-leaved Mint.

M. floribus verticillatis, foliis ovato-lanceolatis utrinque acutis, calyce undique hirsuto, pilis pedicellorum patentibus.

Mentha verticillata. Mill. Dict. ed. 8. n. 17. Herb. Miller.

M. verticillata aromatica, folio longiore et acutiore. *Rand. Mss.*

M. aquatica verticillata odoris grati. *Herb. Buddle.*

Ad fluviorum margines, rariùs. Fl. . . .

Observed by Mr. Rand on the side of the river Medway, Kent;
Buddle; between Rochester and Chatham. *Miller.*

Herba hirsuta, odore suavi. *Caulis* erectus, bipedalis, subsimplex, pilis arctè deflexis. *Folia* brevius petiolata, patentia, ovato-lanceolata, utrinque acuta, inæqualiter ferrata, basi apiceque integerrima. *Verticilli* numerosi, sessiles, densi, petiolis ferè æquales, multiflori. *Braëteæ* lineari-lanceolatae, vel subulatae. *Pedicelli* hispidi, pilis horizontaliter patentibus, longitudine variis, subinde recurvatis. *Calyx* tubulosus, undique hirsutus, imprimis ad basin, pilis adscendentibus. *Corolla* extus fauceque pilosa. *Stamina* inclusa.

I know this Mint only by a specimen from Miller's herbarium, presented to me by Sir Joseph Banks, and another in Buddle's collection. It is closely allied to *M. sativa*, and perhaps may be merely another variety of *hirsuta*. The leaves however are narrower, more pointed at each end, and more unequally ferrated. The smell is that of Frankincense Thyme, as in *M. sativa* γ. Its most distinguishing character consists in the hairs which clothe the flower-stalks being either altogether horizontal, or only occasionally recurved at their tips, whereas in *M. sativa* and *hirsuta* they are closely reflexed so as to touch the stalk with their points, and sometimes quite depressed. This mark, added to the shape of the leaves, and the whorls being altogether sessile, make me venture to describe this as a distinct species, at least till some botanist has an opportunity of investigating it in its native place of growth.

9. *MENTHA rubra.*

Tall Red Mint.

M. floribus verticillatis, foliis ovatis, caule erecto flexuoso, pedicellis calycibusque glaberrimis dentibus hirsutis.

Mentha fativa. Sole Menth. 47. t. 24.

M. verticillata. Raii Syn. ed. 3. 232. Riv. Monop. Irr. t. 48. f. 1?

M. crispa. Hort. Eyst. Æst. ord. 7. t. 5. f. 1.

M. crispa verticillata. Baub. Pin. 227. Moris. sect. 11. t. 7. f. 2. Herb. Bobart.

M. crispa verticillata, folio rotundiore. Raii Syn. ed. 2. 124. Baub. Hist. v. 3. p. 2. 215. Herb. Buddle. et Herb. Sherard.

M. prima. Dod. Pempt. 95.

M. fativa rubra. Ger. em. 680.

M. cruciata. Lob. Ic. 507.

In fossis, et ad fluviorum margines. Fl. Septembri.

By Hackney river at the ferry-house. Herb. Sherard. In Peckham fields. Dill. in Raii Syn. North Wales and Shropshire. Mr. Sole. By the road side between Edmonton and Enfield; also near Walthamstow. Mr. Edward Forster. Under a wet hedge in the road from Watton to Saham church, Norfolk, plentifully.

Herba glabriuscula odore forti congenerum. Caulis 4—6-pedalis, erectus, flexuosus, parùm ramosus, purpurascens, glaber. Folia petiolata, latè ovata, inciso-ferrata, saturatè viridia, lucida; subtùs pallidiora, venis subhirsutis: superiora minora et subrotunda, interdùm crispa. Verticilli numerosi, pedunculati, multiflori. Bractee lineari-lanceolatae, apice subciliatae; interiores setaceae. Pedicelli

Pedicelli teretes, purpurei, lucidi, glaberrimi. *Calyx* tubuloso-campanulatus, resinoso-punctatus, glaberrimus, dentibus ciliatis, quandoque dorso hirsutis. *Corolla* magna, purpurea, glabra, resinoso-punctata. *Stamina* longitudine varia.

This is a very distinct species of *Mentha*, often cultivated in gardens, where it is sometimes called Heart-mint, or Red-Mint, and found wild in different parts of the kingdom; yet it has never been well understood by late writers. Linnæus appears not to have known it, for it is not in his herbarium, and he confounds its synonyms with his *M. sativa*. Whether Hudson comprehended this species under his *rubra*, I know no means of determining. It appears clearly to be what Ray and Dillenius intended in the places above quoted, both from what they have said upon the subject, and the specimens in all the old herbariums. Those in the collection of Sherard have a number of quotations of the old authors in his hand-writing. Some other hand has added the synonym of Rivinus, *Mentha verticillata*. Probably this may have been done by Dillenius, for he has first inserted the Mint by that name in the *Synopsis*; but I very much doubt its propriety. A loose ticket, in the hand of Samuel Dale I believe, has the synonym of C. Bauhin, and "I have found this in three several places." On another loose ticket is written with a pencil, in a hand I am unacquainted with, "Odor Menthæ hortensis. Hackney river at the ferry house, Sept. init." Hence we learn that the conjecture of Mr. Edward Forster, of the *M. sativa* of Linnæus being the mint Dillenius had from the Hackney river, see *Engl. Bot.* 448, however probable, is not exactly true. Dillenius indeed as well as Ray confounded *M. sativa* with the mint of the Hackney river; but I suspect they did so from the report of Bobart and his brother, without comparing specimens. My reasons for
this

this conjecture are as follows. There is not to be found in the collections of Buddle or Sherard any specimen of *M. sativa* with marks of its having been gathered by Tilleman Bobart at Shotover, or with any indication of its being the supposed hairy variety of the *M. verticillata* of the Synopsis. We learn those particulars only from Bobart's herbarium. In that collection is a paper of the tall Red Mint, my *rubra*, marked with several of the synonyms I have adopted. With this is one loose specimen of *M. sativa*, and a note in Buddle's writing, saying, "I want your brother Tilleman's variety of this, *hirsutie foliorum discrepans*." Hence I conclude *M. sativa* to be that supposed variety, of which perhaps James Bobart had no duplicate to send Buddle, and he might put his note to the specimen as a memorandum to procure him the plant at some future opportunity, which seems never to have happened, as it is not in Buddle's herbarium at present.

It is certainly very wonderful that any botanist could confound *M. sativa* with the plant now under consideration, even without attending to the calyx and flower-stalks, which in the *rubra* are always perfectly smooth, except a few hairs on the margin, rarely on the back, of the teeth of the calyx. The smooth reddish zigzag stem, with a very few short branches curved in various directions, rising to the height of 5 or 6 feet when supported by bushes; the deep-green shining nearly smooth leaves; the large handsome purple flowers; readily distinguish the *M. rubra* from all others, nor is it liable to the variations to which most species are subject.

10. MENTHA *gentilis*.*Bushy Red Mint.*

M. floribus verticillatis, foliis ovatis, caule ramosissimo patulo, calycibus basi, pedicellisque, glabris.

Mentha *gentilis*. Linn. *Sp. Pl.* 805.

M. rubra. *Sole Menth.* 41. t. 18.

β, M. rivalis α. *Sole Menth.* 45. t. 20.

γ, M. variegata. *Sole Menth.* 43. t. 19.

M. arvensis verticillata versicolor. *Morif. sect. 11. t. 7. f. 5. Herb. Buddle.*

M. crispa verticillata. *Herb. Clifford.*

In aquosis et ruderatis rariùs. Fl. Augusto.

α, in pools and brooks between Mole and Llanroost, North Wales.

Mr. Sole. β, in Lock's-brook between Weston and Twerton, Somersetshire. Mr. Sole. γ about towns, but scarcely to be met with truly wild.

Herba subhirsuta. Caulis erectus, pedalis (in β tripedalis), scaber, ramosissimus, ramis elongatis, patentibus. Folia petiolata, ovata, obtusiuscula, serrata, lætè viridia, utrinque pilis sparsis brevibus subhirsuta, venis subtùs albidis, omnia ferè conformia; in β longiora et subelliptica; in γ variegata. Verticilli subsessiles, multiflori; in γ interdum longiùs pedunculati. Bractæ lanceolatæ, magnitudine variæ. Pedicelli teretes, purpurei, sæpiùs glaberrimi; in γ subinde parùm hirsuti, pilis deflexis. Calyx tubuloso-campulatus, supernè hirsutus, pilis adscendentibus; basi glaber; undique

dique resinoso-punctatus. *Corolla* pallidè purpurascens. *Stamina* inclusa.

Mr. Sole's specimen of his *M. rubra* most precisely agrees with the original Linnæan specimen of *gentilis*, and it is on his authority I reckon this among the British Mints. His *rivalis* α appears to me the same in every essential point, differing only in having a taller stem, and the lower leaves more elliptical. His figure indeed bears more resemblance to some of the supposed varieties of this species, which I have already referred to *fativa*, more especially in the hairiness of the calyx. We must not however pay too much attention to that circumstance in any of Mr. Sole's plates, his artists (however excellent) not having had it in view. Nor is it fair to charge any body concerned with neglect on that account, the most acute botanists having never considered the pubescence of the calyx or flower-stalk as of any material importance in this genus.

The variegated Mint, so common in gardens and about cottages, agrees with the Linnæan *gentilis* in every particular, and not with *arvensis*, to which Bobart referred it in Morison's work. In one part of Buddle's herbarium it is marked *Calamintha ocymoides* of Tabernæmontanus; and indeed his figure is not unlike it. In the Clifortian herbarium it is erroneously named *M. crispa verticillata*. I find by a specimen from Bobart in Buddle's collection, and another in his own at Oxford, that he at one time supposed this variegated Mint to be *M. arvensis verticillata, folio rotundiore, odore aromatico*, of Vernon. *Raii Syn. ed. 2. 123.* But as he has omitted this synonym in Morison's work, he probably altered his opinion; and indeed I have a specimen of a different plant which appears more likely to be that of Vernon, as will be mentioned under *M. arvensis*.

This variegated variety is liable to have all its whorls elevated on footstalks above half an inch long, in which case the bractæ are more numerous as well as larger. In a very dry gravelly garden I have observed, among a thousand specimens, some few more downy in every part than the rest, and in these only the calyx and flowerstalks also were hairy. But this is a very rare alteration in Mints, nor do I know another instance of it. The direction of these hairs was almost as in *M. sativa*; whereas in *arvensis* they are strictly horizontal: a distinction that will always be found very important.

II. MENTHA *gracilis*.

Narrow-leaved Mint.

M. floribus verticillatis, foliis lanceolatis subsessilibus, caule ramosissimo erecto, calycibus basi pedicellisque glaberrimis.

α , *Mentha gracilis*. *Sole Menth.* 37. t. 16.

M. gentilis. *Engl. Bot.* t. 449. *With.* 524.

M. rubra. *Huds.* 252.

M. fusca sive vulgaris. *Raii Syn. ed.* 1. 78. *ed.* 2. 123. *ed.* 3. 232.
Herb. Buddle.

M. verticillata glabra, odore M. sativæ (viridis). *Herb. Sherard.*

M. angustifolia glabra, odore M. spicatæ. *Dale in Herb. Sherard.*

Balsamita officinarum. *Hort. Eyst. Æst. ord.* 7. t. 3. f. 3.

β , *Mentha pratensis*. *Sole Menth.* 39. t. 17.

γ , *M. gentilis*. *Sole Menth.* 35. t. 15.

M. hortensis verticillata, Ocymi odore. *Morif. sect.* 11. t. 7. f. 1.
Herb. Buddle.

M. car-

M. cardiaca. Ger. *em.* 680, ex icone.

M. verticillata minor, acuta, non crispa, odore Ocymi. *Bauh. Hist. v. 3. p. 2. 216*, ex descr.

In aquosis, pratense humidis. Fl. Augusto.

α , at Bocking and Stoke-Newington. *Herb. Sberard.* Near Walthamstow. *Mr. B. M. Forster.* Near Bradford, Wilts. *Mr. Sole.* At Saham, Norfolk. β , in the New Forest, Hants. *Mr. Sole.* γ , frequent in ditches and waste places near towns and villages, but scarcely wild. *Mr. Sole.*

Herba subhirsuta. *Caulis* erectus, sesquipedalis, scaber, rubicundus; medio præcipuè ramosissimus. *Folia* subsessilia, uniformia, lanceolata, acuta, ferrata, basi angustata, lætè viridia, utrinque pilis brevibus subhirsuta; in β deflexa. *Verticilli* multiflori, sæpiùs sessiles, interdum pedunculati. *Bractææ* lanceolatæ, hirsutæ. *Pedicelli* teretes, purpurei, omninò glaberrimi. *Calyx* tubuloso-campanulatus, purpureus, resinoso-punctatus; basi glaberrimus; apice dentibusque hirsutus, pilis albis, erectis. *Corolla* purpurea, apice barbata. *Stamina* inclusa.

When the description in *Engl. Bot. p. 449* was written, I supposed this Mint not to be specifically distinct from *M. gentilis* of Linnæus. To this I was led by the exact agreement of their calyxes and flower-stalks, except indeed that the latter, as well as all the lower part of the calyx, are more constantly and completely smooth and polished in *M. gracilis* than in the preceding. Mature consideration has now induced me to separate them, and it is never too late to correct an error. *M. gracilis* has lanceolate, sharp-pointed, sharply ferrated and almost sessile leaves, more upright branches, and the

smell of *M. viridis*, at least in the most common variety, α .— β has the flavour of *M. piperita*, and is besides remarkable for its deflexed leaves. The very near resemblance in sensible qualities of these two varieties to the two species just named, led me at one time to suspect the inflorescence had here again deceived us, and that they were only varieties of those spiked Mints. A careful examination of that important part, the calyx, however, guarded me against this error, at least as far as *M. piperita* is concerned. The calyx of that species is much longer, less campanulate, and more acutely ribbed than in any variety of *M. gracilis*; in short its form and appearance, without adverting to other parts of the plant, sufficiently prove them to be distinct. In *M. viridis* I am obliged to confess the calyx most precisely accords in every particular with that of *gracilis*. But the leaves of the latter being attenuated at the base, and by no means so strongly veined, or rugose, as in the *viridis*, even without considering the inflorescence, prevent us from confounding them. I speak now of *gracilis* α ; for in β and γ the leaves are much less attenuated at the base, and more approach to an ovate form. γ is the mint Caspar and John Bauhin characterized by its smell, which they justly compared to *Ocimum* or Sweet Basil. This is not perceptible in all stages of its growth, but very permanent in dried specimens, in which it resembles the flavour of Muscadel Grapes. In this plant the leaves that accompany the flowers are so very much smaller than the rest, and often so like bractææ, they almost reduce it to the spiked division of the genus. It is indeed a most puzzling plant. Perhaps it ought to be reckoned a species, and arranged next to *M. viridis*. This is a point I must leave to those who can study it in a truly wild state. In garden specimens I find the floral leaves vary too much in size to enable me to come to any positive determination.

12. *MENTHA arvensis.*

Corn Mint.

M. floribus verticillatis, foliis ovatis, caule ramosissimo, calycibus campanulatis undique hirsutis pilis patentibus.

Mentha arvensis. *Linn. Sp. Pl.* 806. *Huds.* 253. *With.* 524.
Hull. 128. *Relb.* 224. *Sibth.* 182. *Abbot.* 127. *Sole Menth.*
29. t. 12. *Fl. Dan.* t. 512.

M. floribus verticillatis, foliis ovatis acutis ferratis. *Linn. Hort.*
Cliff. 307. n. 5. *Herb. Cliff.*

M. verticillata hortensis odore *Ocymi* C. B. *Pin.* *Herb. Cliff.* nec
Bauhini.

M. aquatica. *Raii Syn. ed.* 1. 78.

M. feu Calamintha aquatica. *Raii Syn. ed.* 2. 123. *ed.* 3. 232.
Herb. Buddle.

M. arvensis verticillata procumbens. *Morif. sect.* 11. t. 7. f. 5.

Calamintha aquatica. *Ger. em.* 684. *How. Phyt.* 18. *Merr.*
Pin. 18.

β, *Mentha arvensis major*, verticillis et floribus amplis, foliis latioribus,
staminibus corollâ longioribus, odore grato. *Sole Menth.* 29, γ.

γ, *M. præcox.* *Sole Menth.* 31. t. 13.

δ, *M. gentilis.* *Mill. Dict. ed.* 8. n. 15. *Herb. Mill.*

M. verticillata, rotundiore folio, odore *Ocymi.* *S. Dale. Mfs.*

M. verticillata glabra, foliis ex rotunditate acuminatis, *Buddle.*
Herb. Buddle & Herb. Bobart.

M. arvensis verticillata, folio rotundiore, odore aromatico. *Raii*
Syn. ed. 2. 123? *ed.* 3. 232?

ε, *M. agrestis.* *Sole Menth.* 33. t. 14.

In arvis inundatis, præcipuè arenosis. Fl. Junio, Julio.

γ , in moist meadows. *Mr. Sole.* δ , on the right hand of the road from Bocking to Gossfield, Essex. *Mr. Dale.* At Shelford, Cambridgeshire; *Mr. Wigmore.* *Ray?* ϵ , common in corn-fields and neglected gardens about Mendip hills, Shepton-Mallet and Frome, Somersetshire. *Mr. Sole.*

Herba magis vel minus pilosa, odore forti, sæpiùs peculiari et ingrato.

Caulis ramosissimus, plerumque diffusus; in γ et ϵ erectus. *Folia* petiolata, ovata, seu elliptico-ovata, obtusiuscula, variè serrata; in ϵ rugosa, et ferè cordata. *Verticilli* multiflori, subsessiles. *Bractææ* lanceolatae, subtùs hirsutæ. *Pedicelli* teretes, apice purpurascens, sæpe glaberrimi, interdum plus minus hirsuti, pilis sparsis, subreflexis. *Calyx* brevis, campanulatus, obsoletius sulcatus, resinoso-punctatus, undique pilosus, pilis horizontaliter patentibus. *Corolla* dilutè purpurea, extùs pilosa. *Stamina* in α et β exserta, in γ , δ et ϵ inclusa.

The common *M. arvensis* is one of the few Mints that every botanist calls by the same name. It is met with in the borders, or between the furrows, of corn-fields, especially in places where water has stagnated in the winter. Its pale-green downy surface, branched diffuse stem, and especially a peculiar strong odour which comes from every part of the herb when touched, and which most people compare to that of blue mouldy cheese, readily distinguish it. To which may be added the campanulate short figure of its calyx, and the long hairs which entirely clothe that part projecting horizontally. If this circumstance be attended to, it can never be confounded with any of the preceding. The flower-stalk is round, polished, purple in the upper part, often quite smooth, but for the most

most part clothed with a few scattered hairs, rather pointing downwards, most numerous about the upper half of the stalk. The specimen in the Cliffortian herbarium, referring to n. 5 of *Hort. Cliff.* has the flower-stalks more hairy than usual. Another in the same collection, which I have cited above, has them nearly smooth.

My 2d variety β , Mr. Sole's third, differs very little indeed from the common one, except in being rather larger, from its situation in wet meadows. The stamina in both are for the most part longer than the corolla. Mr. Sole's 2d variety I have not seen. He describes it with a reddish upright stem, narrow leaves, and a pleasant smell.

γ flowers earlier than the common kind, and has a more shining surface, though clothed with short hairs. The leaves also are more recurved and elliptical. In smell I can find no difference, nor can I discover any thing on which to found a specific distinction. The stamina being shorter than the corolla cannot be thought sufficient.

δ I know only by the original specimen in my possession, gathered by Dale, and described by Miller as *gentilis*. I have never seen it living. The specimen in Buddle's herbarium differs only in having the base of the calyx perfectly smooth, whereas in mine that part is all over hairy. The leaves are shorter and broader than in common *arvensis*, but no other difference is discernible. The scent of Basil, which Dale attributes to it, can only mark it as a variety.— I think there is the greatest probability of this being Mr. Vernon's aromatic mint mentioned in Ray's *Synopsis*; but having seen no original specimens, I quote it with hesitation. In Buddle's herbarium is a specimen of *M. sativa* γ , with rounder and shorter leaves than usual, found in 1710 by the 'Thames' side near the Neat-houses, Chelsea, by himself in company with Mr. Rand, which he says they agreed to be Vernon's plant. Hence it appears that plant was even then.

then only to be determined by guess, and Dillenius has merely copied it into his edition of the *Synopsis* without any additional remark. Bobart, as I have already mentioned, once took the variegated *gentilis* of the gardens to be the Mint of Vernon. I know not that this uncertainty can ever be removed, except some old herbarium should unexpectedly afford an original specimen.

ε is a very remarkable plant, for which I am obliged to Mr. Sole, the only person I believe who has found it; and I have been much inclined to make it, as he does, a distinct species. Its leaves are very broad and almost heart-shaped, marked with strong parallel veins which render them rugose. The stamina are shorter than the corolla. In every other particular, even in smell, it agrees perfectly with *M. arvensis*, especially in the calyx and flower-stalk; and I think it must be considered as a variety, for I have abundant proofs that the shape of the leaves is more liable to vary in this species than even most others.

13. MENTHA *Pulegium*.

Penny-Royal.

M. floribus verticillatis, foliis ovatis, caule prostrato, pedicellis calycibusque undique tomentosis: dentibus ciliatis.

Mentha Pulegium. Linn. *Sp. Pl.* 807. Hudf. 254. With. 525. Hull. 130. Relb. 224. Sibth. 182. Woodv. *Med. Bot. t.* 171. Sole *Menth.* 51. t. 23.

Pulegium. Raii *Syn. ed.* 1. 79. *ed.* 2. 125. *ed.* 3. 235. How. *Phyt.* 99. Merr. *Pin.* 99. Baub. *Hist.* v. 3. p. 2. 256. Fuchf. *Hist.* 198. Riv. *Monop. Irr. t.* 23. f. 1.

P. regium. Ger. *em.* 671.

Pulegium, herba, flos. Pharmac. Lond.

In

In ericetis et pascuis humidis. Fl. Septembri.

Herba odore acri, aromatico. *Caules* prostrati, ramosissimi, repentes, pilosi, angulis obtusiusculis. *Folia* parva, petiolata, ovata, obtusa, crenato-ferrata, subtus præcipuè subhirsuta. *Verticilli* sessiles, pro foliorum ratione magni, numerosi, multiflori. *Bractææ* nullæ. *Pedicelli* tomentoso-incani, seu pilis brevissimis, densissimis, undique tecti.—*Calyx* tubulosus, gracilis, fulcatus, resinoso-punctatus, pilis densis, brevibus, porrectis, undique vestitus, dentibus ciliatis, acutis, inæqualibus, fauce villis albis conniventibus clausâ. *Corolla* calyce duplò longior, purpurea, basi alba, extus villosissima. *Stamina* exserta.

Penny-royal cannot be confounded with any other British Mint, nor is it subject to any varieties worth notice. Culture makes it more luxuriant and erect. Sometimes the flower is white. There are some foreign species carefully to be distinguished from it by the different hairiness of the calyx, as well as other marks. They agree with it in the short soft close downiness of its flower-stalks, by which, without regarding its small leaves, and different habit, it is decidedly distinguished from every other British species. This difference confirms the remark I have so often made, of the importance of those parts in characterizing the species throughout the whole genus.

XX. *On two Genera of Plants belonging to the Natural Family of the Aurantia.* By Joseph Corrêa de Serra, LL.D. F.R.S. & L.S.

Read July 2d, 1799.

THE object of this paper is to examine the generic characters and the natural affinities of the *Crateva Marmelos* of Linnè, and of the *Crateva Balangas* of Koenig; two plants, each of which I conceive to be a genus by itself, not only distinct from the *Crateva*, but also belonging to a different natural order.

Among the many advantages deriving to botany from the progress made of late in the knowledge of the natural affinities of plants, one of the most obvious is the facility it affords in many instances, of recalling to their natural places, plants which, by oversights unavoidable in artificial systems, even the most ingenious, had been associated to extraneous genera. Of this advantage the examination of the two plants above mentioned will, I presume, afford an example.

The affinity of the genus *Crateva* (such as it was first constituted by Plumier *, and adopted by Linnè †,) to all the genera of the *Capparides*, is obvious to every inquirer of natural affinities. However different the principles might have been on which natural arrangements of plants have been attempted, this association has been al-

* Under the name of *Tapia*. *Plum. Nova. Plant. Gen. p. 22. t. 21.*

† In the first edition of *Gen. Pl. p. 113.*

ways acknowledged as strictly natural. To the sagacity and profound science of Jussieu we are of late indebted for the constant and almost exclusive characters which distinguish this family, and circumscribe its affinities. He remarked, that the seeds in this natural order contain a crooked embryo without perisperm; that their placentation is always parietal, in a fruit which in consequence must be mostly unilocular*.

The *Crateva marmelos* of Linnè, and the *Crateva balangas* of Kœnig, I have observed in the herbarium of the Right Hon. Sir Joseph Banks, and I have received the fruits of both from him. Upon examining the fruits I have found that their seeds contain a straight embryo with a small radicula, and fleshy, large, plano-convex cotyledons; and that their placentation is central, in a multilocular fruit: they cannot therefore be species of *Crateva*. The further examination of the other parts of their fructification confirms this first opinion, and, shewing how far they differ from the *Crateva* in other important points, gives us a clue to find their proper place in the natural system.

But before I proceed to the description of the fructification of these two plants, as I intend to deviate in some manner from the common method of describing, I must give the reasons which persuade me of the utility and perhaps necessity of the alterations I adopt, and show that singularity, or spirit of innovation, are not my motives, but that the present state of science requires, in some manner, this change of method.

Of the six divisions in the Linnæan method of describing genera, four relate to the flower, and exist at the same period, viz. the calyx, coroll, stamina, and pistill; the other two exist after the decay of the preceding, viz. the pericarp and the seed. They are the off-

* Jussieu Gen. Pl. p. 246.

spring of the flower rather than a part of it; and their structure at the period when they are the objects of observation and description, has often received material alterations from their state when in the flower. Linnè considered them in this light, when he described the germen, that is to say, the fruit as it exists in the flower, as a part of the pistill; and again described it in the articles of pericarp and seed, to show its structure as it exists, long after the decay of the flower, when ripe and perfect.

Former botanists having given great attention to the calyx and coroll, and the sexual system being founded on a minute consideration of the stamina and pistill, these four parts are accurately and carefully exhibited in the Linnæan descriptions of genera, but this is not the case with respect to the fruits or the seeds. We are at present enabled, by the observations of Jussieu, Gærtner, and a few other botanists, to describe these important objects with an accuracy unknown to former ages, and to collect from the detail of their parts a number of characters, (many of them of great weight,) which, multiplying the points of comparison, establish more firmly the degrees of affinity or difference betwixt plants, and thereby lead us to a more intimate knowledge of their nature. Even in the description of the flower, the progress made by botany since the death of Linnè requires perhaps some change: 1st, Because the insertion of the stamina, a character of a superior order, was by him carefully marked only in the Icosandria, Polyandria, and Gynandria, in which classes it is (if I may be allowed the term) the classific character. 2dly, Because in proportion as that multitude of different organs which go by the general and in many instances unmeaning name of *nectarium*, are physiologically discriminated, and accurately defined, the necessity of marking them for what they are in nature, is more and more sensibly felt. And 3dly, because the *germen* itself, as a part of the flower, varies

varies very often, in number of locuments and of seeds, from the ripe fruit.—The comparison of these two states, of the same object, requires an attention, from those who seek the ways of nature, far greater than has been hitherto bestowed on it.

These reasons, I hope, will be a sufficient excuse in the eyes of every candid Botanist, for my attempting to describe the fructification of the plants which are the subject of this paper, in twelve, instead of six divisions, in the following manner :

1. The *flower*, in the four usual Linnæan divisions of *calyx*, *coroll*, *stamina*, and *pistill*; marking, however, the insertion of the stamina, and the nature of what Linnè, in analogous plants, has called nectarium.
2. The *fruit*, in four divisions, viz. the parts of the flower which persist and accompany the fruit, and which I design by the name of *induvia*, the *pericarp*, the *placentation* of the seeds, and the *dehiscentia*.
3. The *seed*, in four divisions, viz. its *form*, its *integuments*, the *perisperm*, and the *embryo*.

The two genera which we are now to consider are deficient in some of these parts; but it is equally interesting to the Botanist to know the absence of such parts, as to be acquainted with their form when present. What new terms I am obliged to employ shall be explained in the notes.

The following is the fructification of the *Crateva marmelos* of Linnè, to which, conceiving it to be a new genus, I give the name of

ÆGLE*.

* FLOS.

- CAL. *Perianthium* monophyllum parvum quinquelobum fructum non comitans †.
- COR. *Petala* quinque calyce multoties majora, patentia ovato-acuta.
- STAM. *Filamenta* plurima brevia fubulata in receptaculi elevati, seu disci hypogyni parte externa inserta; *Antheræ* oblongæ erectæ.
- PIST. *Germen* ovatum superum. *Stylus* brevis crassus. *Stigma* ovale (fulcis plurimis obsoletè fulcatum juxta Koenig).

** FRUCTUS.

- INDUVIÆ nullæ.
- PERIC. *Bacca* corticosa turbinato-globosa, cortice glabro scrobiculato per maturitatem lignoso. *Loculamenta* (in meo specimine) decem cincta carne spongiosa, post maturitatem evanida.
- PLACENT. *Chorda pistillaris* ‡ composita centralis; chordulæ par-

* One of the Hesperides.

† The calyx remains after the flowers decay, but falls before the maturity of the fruit; as I have seen in the specimens which I have observed.

‡ In every fruit, properly so called, there is a longitudinal bundle of fibres and vessels which may be traced from the insertion of the fruit in the receptacle to the stigma: to this bundle the seeds are affixed, from it they originated, and through it they are most probably fecundated. This important bundle I call *chorda pistillaris*.

tiales

tiales tot quot loculamenta axi suberoso coalitæ.
Semina in unoquoque loculamento plurima simplici
serie disposita, funiculo umbilicali recto brevi chor-
dulis affixa.

DEHISC. nulla.

*** SEMEN LIBERUM.

FORMA. Semen subovatum compressum, versùs umbilicum an-
gustatum, pilosum.

INTEG. duplex; exterius coriaceum pilis intertextis glutinosis
vestitum; interius membranaceum ad alterum latus
funiculo adnato stipatum in obtusiori parte chalaza
lata ferruginea notatum.

PERISP. nullum.

EMBR. femini conformis lutescens, cotyledones duo plano-con-
vexæ carnosæ, radícula minima.

This description is made from specimens sent from India by
Dr. Roxburgh, Dr. Ruffel, Dr. Kœnig, and by the Moravian mis-
sionaries of Tranquebar.

Two seemingly distinct species of this genus exist in the her-
barium of Sir Joseph Banks, both arboreous, and both growing in
the East Indies. To that which has been known under the name
of *Crateva marmelos*, I continue the old trivial name, and call it
Egle marmelos.

The *Crateva balangas* of Kœnig, known to the English in the East Indies by the name of Elephant apple, has the following fructification; and, as a new genus, I give it the name of

FERONIA*.

* FLOS.

- CAL. *Perianthium* monophyllum quinquepartitum planum parvum (deciduum ex Kœnig.)
- COR. *Petala* quinque oblonga acuta patentia calyce multoties longiora.
- STAM. *Filamenta* decem, basi lata compressa, utrinque ad basin villosissima, erecta, in receptaculo elevato seu disco hypogyno inserta. *Antheræ* obovatæ erectæ.
- PIST. *Germen* subovatum superum. *Stylus* brevis conicus. *Stigma* acutiusculum.

** FRUCTUS.

- INDUVIÆ nullæ.
- PERIC. *Bacca* corticosa turbinato-ovata, cortice aspero per maturitatem lignoso. *Loculamenta* plura, carne fungosa obvoluta.
- PLACENT. *Chorda pistillaris* composita centralis; chordulæ partiales, tot quot loculamenta, in basi et apice pericarpium tantum unita, cæterum plus minusve per maturitatem? divergentia. Semina in unoquoque loculamento plura, simplici serie disposita funiculo umbilicali lato chordulis affixa.
- DEHISC. nulla.

* One of the Deities to whom the Ancients dedicated Forests.

*** SEMEN.

*** SEMEN LIBERUM.

- FORMA. Semen ovatum lenticulari compressum pilosum.
INTEG. duplex; exterius membranaceum pilis intertextis vestitum, interius coriaceum, in obtusiori parte chalazala ferruginea notatum.
PERISP. nullum.
EMBR. Semini conformis albescens, cotyledones duæ planoconvexæ carnosæ, radícula minima.

This genus I have described from specimens sent from India by Dr. Ruffel and Dr. Kœnig. We are acquainted with only one species, a tree growing in the forests of India, which I call *Feronia elephantum*, from the name by which it goes among the English inhabitants of the East Indies.

Plants are always better described from fresh, than from dried specimens; but in order to satisfy myself, and to be able to answer for the characters, I have scrupulously avoided giving any which were not discernible in the specimens before me*, though Kœnig's descriptions of the *Crateva marmelos* and *Balangas*, are more explicit

* For instance, the hilum I have not marked, in either of the two genera, because I could not sufficiently distinguish its figure. That of the *Feronia* seems to me worthy the attention of the botanists who may have occasion to observe it in a fresh specimen. The flesh, which in both genera surrounds the locuments, I describe such as it was in the dry specimens after having been soaked. The membranes, which form the locuments, I have not described, though essential parts, because I conceive they must be very different in the fresh fruit, from what they appeared to me in the dry specimens. I must notice, however, that their interior surface, in both genera, is covered with large round scars of dried vesicular glands, of which I will hereafter take an opportunity of speaking more at large, and in a more proper place, in a Memoir on the Natural Order of the *Aurantia*.

in what respects the flower, having the advantage of being made from living subjects.

The seeds, the fruits, the insertion of the stamina on a *discus hypogynus*, surrounded by a *calyx monophyllus*, and a coroll of a defined number of petals, shew to a demonstration that these two genera belong to the family of the *Aurantia*. What place they are to occupy among their affinities, and consequently what are their true essential and differential characters, will be discussed in a future paper on this natural order.

XXI. *Descriptions of the Mus Bursarius and Tubularia Magnifica; from Drawings communicated by Major-General Thomas Davies, F.R.S. & L.S. By George Shaw, M.D. F.R.S. V.P.L.S.*

Read June 4, 1799.

THE *Mus bursarius* belongs to a particular division in the genus, containing such species as are furnished with cheek-pouches for the temporary reception of their food. It seems not to have been yet described, or at least not so distinctly as to be easily ascertained. It approaches however to one or two species mentioned by Dr. Pallas, Mr. Pennant, and others; but differs in size, being much larger, as well as in the appearance of the fore-feet, which have claws differently formed from any of the pouched species hitherto described.

In order to secure its knowledge among Naturalists, it may be proper to form for it a specific character, viz.

Mus cinereus, caudâ tereti brevi subnudâ, genis faccatis, unguibus palmarum maximis fossoriis.

Ash-coloured rat, with short round nearly naked tail, pouched cheeks, and the claws of the fore-feet very large, formed for burrowing in the ground.

The cheek-pouches are far larger in proportion to the animal than in any other of this tribe, and therefore have given occasion for the specific name.

This quadruped was taken by some Indian hunters in the upper parts of Interior Canada, and sent down to Quebec. It is now in the possession of Governor Prescott.

TAB. VIII. exhibits the *Mus bursarius* of its natural size.

THE *Tubularia magnifica* must be considered as by far the largest species of its genus yet discovered. It is found in various parts of the coast of Jamaica, adhering to the rocks. It is very shy, and on being approached instantly recedes within its elastic tube, which on a farther alarm also retires into the rock, and specimens can be obtained only by breaking off such parts of the stone as contain them. These, being put into tubs of sea-water, may be kept for months in perfect order; and from one of them so preserved this drawing was made.

The specific character may be thus given:

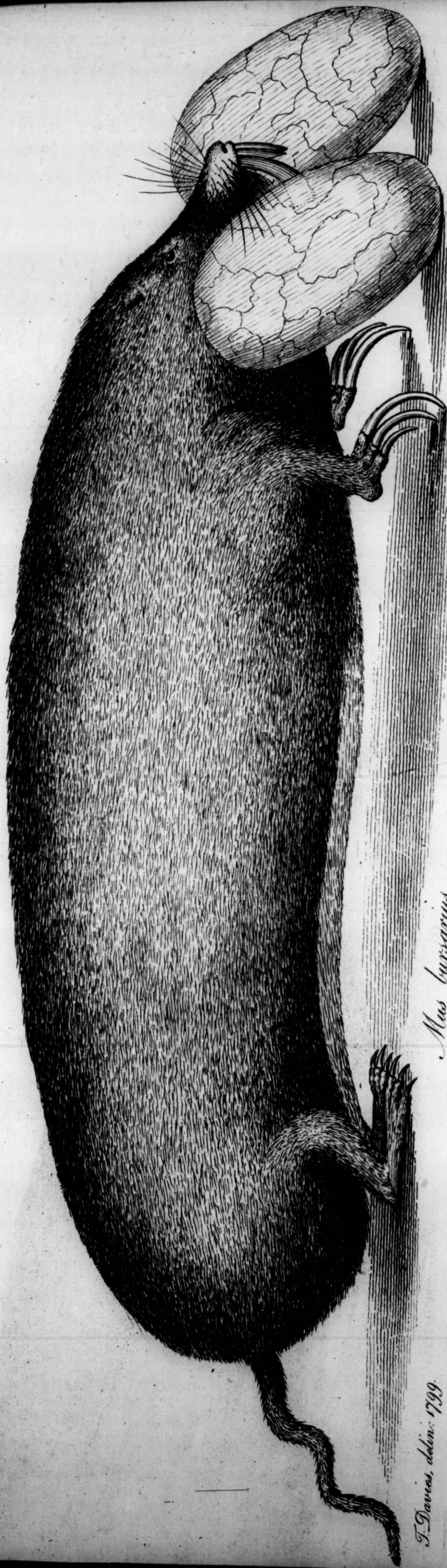
TUBULARIA *tubo simplici albido, tentaculis numerosissimis albo rubroque variatis.*

Tubularia with a simple whitish tube, and very numerous tentacula variegated with red and white.

It is necessary to observe, that, in the form of its body, at least as far as can be judged from the part represented in the back view of the animal, it seems to make an approach to the genus *Amphitrite*, and may be considered as in some degree connecting these two genera.

It may perhaps be doubted whether some of the smaller figures, supposed to be the young animals, may not in reality belong to some species of *Actinia*.

TAB.



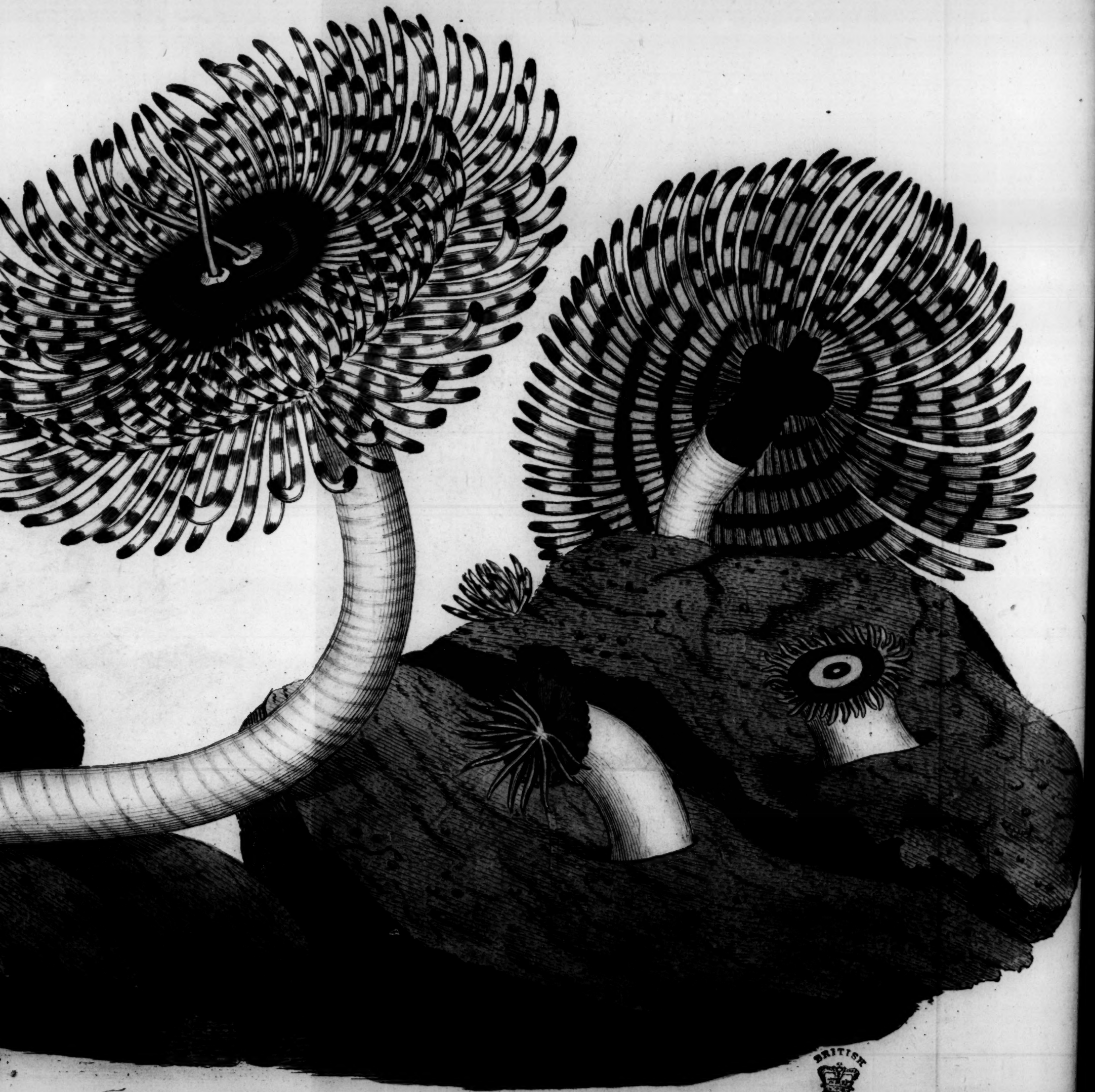
J. Davis, delin. 1799.

Mus bursarius.





J. Davis. delin. 1799



Tubularia magnifica.

TAB. IX. *Fig. 1.* shews the back of the *Tubularia magnifica*, when expanded, of its natural size.

2. The front.
3. The animal expanding from the tube.
4. The same retreating when disturbed.
5. Entirely withdrawn into the tube.
6. Supposed young ones of the same species.

XXII. *Account of the Flustra Arenosa, and some other Marine Productions.*

By Henry Boys, Esq. F. L. S.

Read June 4, 1799.

FLUSTRA *arenosa*.

Fl. crustacea arenosa lutosa, poris simplicibus subquincuncialibus.

Ellis Zooph. p. 17. n. 10. Gmelin Syst. Nat. v. i. 3829. Pallas

El. Zooph. p. 37. n. 5. Ellis Corall. p. 74. t. 25. f. c. Raii

Syn. p. 31.

English Sea Mat.

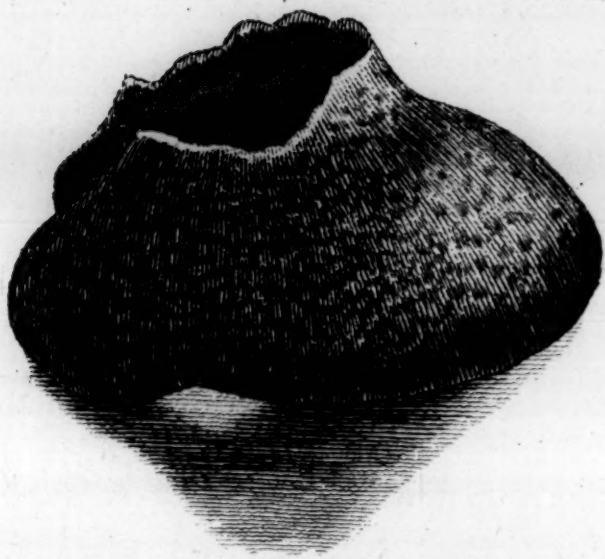
TAB. X.

IT may not be improper to transcribe Mr. Ellis's account of this production.

"This sea mat is formed of sand and slime into a crustaceous body, with small mouths placed almost in a quincunx order."

"This was sent me from Holyhead in Wales. Its form, when intire, was exactly like the upper semicircular part of a colt's hoof. The surface of each of the cells was a little hollow in the middle, with a small hole in each. From the appearance it made when I received it intire, I judged it to be what Imperatus calls his *Lorica marina*.—There is a layer of sand and slime under as well as over

Linn. Trans V. tab 10 p 230.



Flustra arenosa

Hen. Boys delineavit. 1797.



the cells which compose it.—It is very friable when dry. Whether it belongs to this genus or not, I submit to the curious." *Ellis Zooph. p. 17.*

Great numbers of these bodies are found, in the spring, on the sandy shore between the mouth of Sandwich Haven and Deal, at low water; in some years more than in others; particularly in May 1797.—It is undoubtedly the nidus of some marine animal, as I have found the cells intire, with eggs in each.

In the summer season there is frequently found on the same shore, clusters of black roundish bodies united together by short cords, forming very exactly the resemblance of bunches of black grapes both as to size and colour. The substance is tough and elastic, and the bodies consist of several coats, the outermost of which is black, and the innermost perfectly transparent; and they are filled with clear water, containing the eggs, and sometimes the living embryos of the *Sepia officinalis*.

During the same season we likewise meet with large masses of a jelly-like substance, to which are connected a number of tuberculated appendages bearing together the resemblance of a mop; which tubercles are diaphanous, and include sometimes the eggs and sometimes the embryos alive of another species of *Sepia*—I think the *Loligo*, but am not certain.

XXIII. *An Account of a remarkable Variety of the Beech, Fagus Sylvatica.* By Christian Henry Persoon, M.A. F.M. L.S.

Read October 1, 1799.

TREES in general are not liable to those alterations in their substantial parts that we observe in smaller plants. In some indeed the leaves frequently become by culture variegated with white or yellow spots, and in that state are much admired by lovers of gardening. The Beech however is subject to vary, not only in the colour, but also in the figure of its leaves.

The beautiful variety of this tree with blood-red leaves* is pretty well known, and is multiplied by engrafting on the common kind; but being deficient in vigour, as all such varieties originate in weakness, it does not always succeed.

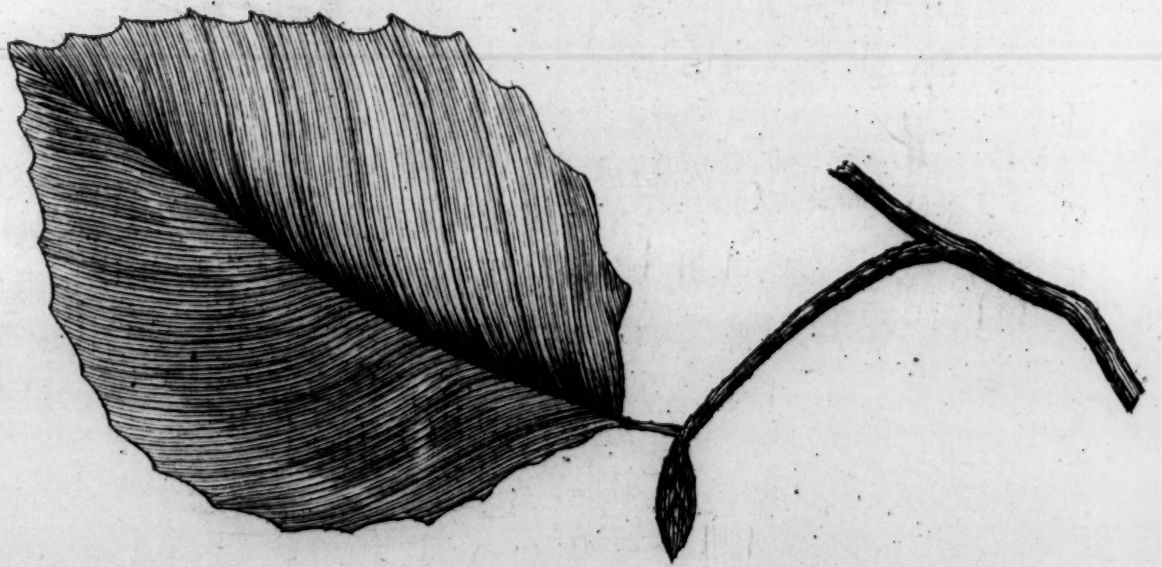
A singular variety with deeply indented leaves has been discovered in Bohemia by Mr. Vignet†, not much unlike the lacinated variety of *Betula alnus* in figure.

A less striking but useful variety is described by Mr. Kerner, under the name of *Mandelbuche*, Almond Beech, growing wild in

* *Fagus sylvatica*, var. *foliis atropurpureis*. V. Burgsdorf *Anleitung zur sichern Erziehung der Holzarten*. Th. 2. p. 91. The author mentions his being also in possession of a variety of the same tree with streaked leaves.

† *F. sylvatica*, var. *laciniata*, *foliis ovato-lanceolatis acuminatis glabris profundè serratis: serraturis acutis patentibus*. A. v. Vignet *Anzeige einer neu-entdeckten Buchenabart*. Vide Schmidts *Sammlung physikalisch-œconomischer Aufsätze*. 1 band. p. 173. t. 1.





Schwenckerley at Natur. del.

the Duchy of Wirtemberg, and which is remarkable for its extraordinarily large leaves and fruit*.

The striking variety, of which I now beg leave to present a short description and figure to the Linnæan Society, deserves above all others the attention of Naturalists. It is so remarkable that, if it were of frequent occurrence, it might seem to claim the distinction of a peculiar species of *Fagus*. I shall however consider it only as a variety, with the following characters:

FAGUS sylvatica; varietas *quercoides*, cortice tessellato-fulcato.

Not far from the village of Reinhaussen, within about two hours ride of Göttingen, is to be seen a single individual of this variety. The people of the country call it *Rammel-busch*, apparently from an opinion of its having originated from the intermixture of an Oak with a Beech.

The bark of the trunk and larger branches is entirely formed like that of an Oak, by which it is at once known from other Beeches. The tree has likewise the crooked, and proportionably short, branches of the Oak; so that a spectator at some distance, or in the winter season, would undoubtedly take it for such.

It is from 40 to 45 feet high, and eight in circumference. The trunk straight and upright, most branching at the top. As it is hollow within, and may probably not last many years, having already some dry boughs in the upper part, it is a pity some attempt has not been made to increase it, and to see if culture makes any change in its nature.

TAB. XI. represents a piece of the bark, with a leaf, of the *Fagus sylvatica*, var. *quercoides*.

* J. S. Kerner's *Beschreibung und Abbildung der Bäume und Gesträuche welche in dem Herzogthum Wirtemberg wild wachsen*. Stuttgart 1793. p. 31.

XXIV. *Catalogue of some of the more rare Plants observed in a Tour through the Western Counties of England, made in June 1799, by Dawson Turner, Esq. F.L.S. and Mr. James Sowerby, F.L.S.*

Read October 1, 1799.

THE expedition which it is in general necessary to employ in passing through a large extent of country, the want of proper books and other conveniences to examine what is found, and, above all, the ignorance of the spots most likely to prove advantageous to his researches, are obstacles which every traveller, whose pursuit is Natural History, must encounter, in a greater or smaller proportion. Of these a very considerable share fell to our lot, the objects that we endeavoured to follow being far more numerous and extensive than our limited leisure would allow us to attain; for it cannot be imagined that the time left for Botany could be considerable, when it is known that in little more than a month we journeyed nearly a thousand miles, striving at the same time to bestow attention upon the other branches of natural history, the manufactures, and the numerous antiquities with which the county of Cornwall eminently abounds.

This, then, must plead our excuse (if indeed an excuse be necessary) for the shortness of the following list, into which we have admitted no plant that we ourselves did not see growing, and from which we have tried to exclude all those that may not be
classified.

classified among the more rare productions of this kingdom; unless, perhaps, in the genera of *Lichen* and *Fucus*, which we considered as tribes so little known in general, that we thought we might be excused if we noticed all excepting the most common. The peculiar season of the year of course prevented our meeting with either *Musci*, *Jungermanniæ*, or *Fungi*.

We have mentioned many habitats that were before quoted by authors, but have been induced to do so from a desire to shew that the plants still exist in the same places; and we now submit the fruits of our researches to the Linnean Society, flattering ourselves with the hope that they may hereafter prove useful to some Botanist, whom chance or inclination may lead to the spots which we visited.

Having premised this, it only remains for us to express the sense we feel of the kind attention we received from the cultivators of Natural History in the places through which we passed, particularly to Richard Bryer, Esq. of Weymouth, to the Rev. J. T. Thomson, and William Penneck, Esq. of Penzance, to Thomas Webb Dyer, and William Clayfield, Esqrs. of Bristol, and to Dr. Williams of Oxford; to all of whom we are happy to own ourselves indebted, as well for repeated instances of civility, as for the trouble they took in pointing out to us the plants growing round their several towns.

Serapias latifolia—St. Vincent's Rock, near Bristol.

Valeriana rubra—Walls of Glastonbury-Abbey, and Oxford. Sometimes with a white flower.

Iris fœtidissima—Hedges about Weymouth.

Eriophorum vaginatum—Marsh near Penzance.

Carex digitata—St. Vincent's Rock.

- Rubia peregrina*—Hedges near Exeter, Plymouth, Sidmouth, Dunster, &c. &c.
- Anchusa sempervirens*—near Liskeard and Barnstaple.
- Symphytum patens*—Meadows between Lyme-Regis and Sidmouth.
- Campanula hederacea*—near Falmouth, Penzance, Camelford, &c.
- *hybrida*—Cornfields near the site of Old Sarum.
- Verbascum Lychnitis*—near Taunton.
- Viola lactea*—Heaths between Liskeard and Lestwithiel.
- Illecebrum verticillatum*—Boggy ground near Penzance.
- Herniaria glabra*—Hedges at the Lizard Point.
- Beta maritima*—Cliffs at Weymouth, Falmouth, &c.
- Daucus maritimus*, With.—Rocks about Castle-Treryn.
- Critbnum maritimum*—common in Cornwall.
- Heracleum Sphondylium* β —Hedges near Holfworthy, Devonshire.
- Ligusticum cornubiense*—near Bodmin.
- Oenanthe crocata*—plentiful in Cornwall.
- Pimpinella dioica*—St. Vincent's Rock.
- Tamarix gallica*—St. Michael's Mount.
- Linum usitatissimum*—Cliffs at Falmouth.
- Scilla autumnalis*—Clifton near Bristol.
- *verna*—Pastures near the Lizard-Point and Land's-End.
- Asparagus officinalis*—near the Ferry and extremity of Portland Island.
- Vaccinium Myrtillus*—Hedges about Liskeard.
- Erica vagans*—abundant on the Downs between Helston and the Lizard.
- Chrysosplenium oppositifolium*—common in Cornwall.
- Dianthus cæsius*—Chedder Rocks—plentiful, but mostly in inaccessible places.
- Silene amæna*, Hudf.—Sea-coast at Weymouth, and in Cornwall.

- Sedum sexangulare*—Ruins of Old Sarum.
 — *anglicum*—common near the Sea in Cornwall and Devonshire.
 — *dasyphyllum*—Walls near Bristol.
 — *rupestre*—Chedder and St. Vincent's Rocks.
Euphorbia Paralias } —Portland-Island; we found the latter only
 — *portlandica* } near the remains of Bow-and-Arrow Castle.
Cratægus Aria—Chedder and St. Vincent's Rocks.
Aquilegia vulgaris—Hedges near Redruth.
Galeobdolon luteum—Wood between Bridport and Lyme-Regis.
Leonurus Cardiaca—Waste ground near Bristol.
Melittis grandiflora, Engl. Bot.—near Ashburton and Liskeard.
Bartsia viscosa—Marshes about Penzance.
Sibthorpia europæa—Damp hedges and boggy ground near Lestwithiel, Falmouth, Penzance, Camelford, &c.
Crambe maritima—Sidmouth Cliffs, in inaccessible places.
Lepidium petræum—St. Vincent's Rock.
 — *didymum*—Rubbish at Penryn.
Thlaspi arvense—Cornfields about Aylesbury.
Cochlearia danica—Sea coast at Portland-Island, and in Cornwall.
 — *anglica*—Marshes near Bristol.
Arabis stricta—St. Vincent's Rock.
Turritis hirsuta—Ruins of Old Sarum.
Brassica oleracea—King's-Cove near Marazion.
Geranium sanguineum—near the Lizard-Point, and Bristol.
 — *columbinum*—Hedges near Liskeard, Taunton, Wells and Bristol.
 — *maritimum*—about the Lizard-Point and St. Michael's Mount.
 — *lucidum*—near Wells.
 — *rotundifolium*—Hedges near Plymouth and Bristol.

Fumaria

- Fumaria capreolata* } — Walls and Hedges round Dunster.
 ——— *claviculata* }
Lathyrus Aphaca } — Cliffs near Sidmouth.
 ——— *sylvestris* }
Vicia sylvatica — Cliff at Ilfracombe.
 ——— *lutea* * — Glastonbury Tor Hill.
Hippocrepis comosa — near Dorchester and Bristol.
Trifolium maritimum } — Marshes below Cooke's Folly near Bristol.
Lotus diffusus }
Hypericum Androsæmum — Hedges near Saltash.
Tragopogon porrifolium — Marshes below Cooke's Folly near Bristol.
Carduus eriophorus — Hedges near Wells.
Senecio squalidus — Walls near the Botanic Garden, Oxford.
Lycopodium Selago — a moist hill between Sidmouth and Exeter.
Osmunda regalis — common in Cornwall.
Asplenium Ceterach — Walls about Wells and Bristol.
 ——— *marinum* — Rocks at the Lizard, Castle Treryn, &c.
Polypodium fragile — St. Vincent's Rock.
Fontinalis minor — Rivulet near Chedder Cliffs.
Bryum crispum — common on trees in Cornwall.
Hypnum crispum — Wood near Wells—in fruit on St. Vincent's Rock.
Lichen foliatus — Stones at Maiden Castle near Dorchester.
 ——— *calcareus* — Limestone Rocks, Cornwall.
 ——— *pilularis* — Stone-Henge.
 ——— *geographicus* — Rocks at Tintagel, and the Valley of Stones
 near Linton, Devonshire.
 ——— *rupicola* — Rocks near the Lizard.

* We gathered this in great plenty, but saw no appearance of *V. hybrida*. See Engl. Bot. 482.

- Lichen coccineus* *—Stone-Henge.
 — *crenularius*—Rocks near the Lizard.
 — *tartareus*—Rocks near Redruth and the Land's End.
 — *byssinus*—Wall at Bristol.
 — *obscurus*—Rocks about Penzance, the Lizard, &c—Stone-Henge.
 — *luridus*—Chedder Rocks.
 — *cartilagineus*—St. Vincent's and Chedder Rocks.
 — *muralis*—small stones on Salisbury Plain.
 — *centrifugus*—Rocks near Redruth.
 — *omphalodes*—near Penzance, Redruth, &c.
 — *globiferus*—Stones near Castle Karn Brè.
 — *fragilis*—Stones, St. Cleere near Liskeard.
 — *pascualis*—between Lestwithiel and St. Austle.
 — *exilis*—Rocks at St. Cleere's near Liskeard.
 — *articulatus*—Trees near Liskeard.
 — *vulpinus*—Rocks and Trees about Castle Treryn, Liskeard, &c.
 — *plicatus*—Trees near Bodmin.
 — *fuciformis*—Rocks near King Arthur's Castle at Tintagel.
 — *Endocarpon*—Chedder and St. Vincent's Rocks.
 — *pulmonarius*—Trees about Camelford, Launceston, &c. We did not find it in fruit.
 — *scopulorum*—Rocks at the Land's End.
 — *glomuliferus*—Trees near Launceston.
 — *caperatus*—abundantly in fruit on rocks near Penzance, and in a Wood near Camelford.

* From a careful examination of this *Lichen*, which I here found in great abundance, I was persuaded of its specific difference from the *L. hematomma* figured in *Engl. Bot.*—They hardly resemble each other in any circumstance except the colour of the shields. D. T.

- Lichen scrobiculatus* } — Trees near Bodmin and Lifkeard.
 — *plumbeus* }
 — *miniatus* — Chedder, St. Vincent's and Tintagel Rocks.
 — *saccatus* — Chedder and St. Vincent's Rocks.
 — *perlatus* — We found this in fruit only in a wood between
 Camelford and Bodmin, and on a stone-fence near Ilfracombe.
 — *fuliginosus* — plentiful upon trees and rocks about Launceston,
 Bodmin, &c.
 — *Tremella* — Rocks in Devonshire.
Fucus tamariscifolius — Falmouth and St. Michael's Rock.
 — *fibrosus* — Falmouth and Ilfracombe.
 — *faeniculaceus* — Weymouth, Lyme-Regis and Falmouth.
 — *kaliformis* — abundant on the Western Coast.
 — *esculentus* — King's Cove (Cornwall) and St. Michael's Mount.
 — *sanguineus* — Portland Island.
 — *alatus* — Weymouth.
 — *hypoglossum* — Mount Edgecumbe.
 — *loreus* — Falmouth and Mount's Bay.
 — *bulbosus* — St. Michael's Mount.
 — *canaliculatus* } — common on the Western Coast.
 — *pygmæus* }
 — *jubatus* — King's Cove and Ilfracombe.
 — *pinnatifidus* var. *osmunda* — Weymouth.
 — *tomentosus* } — King's Cove and Mount's Bay.
 — *tuberculatus* }
 — *aculeatus* — Portland Island and Kynance Cove near the Li-
 zard.
 — *ovalis* — Portland Island, Falmouth and Mount's Bay.
 — *pinastroides* — Weymouth and Portland Island.
 — *subfuscus* — Portland Island. We saw only one specimen.

[*Fucus corneus*—King's Cove.

—— *cartilagineus* } Weymouth.
—— *obtus*

Ulva purpurascens } Mount Edgecumbe and Falmouth.
—— *rubens*

Conferva gelatinosa—near Launceston.

Sphaeria licheniformis—Stones on Glastonbury Tor Hill.

—— *nitida*—in a Wood between Camelford and Bodmin.

Lycoperdon equinum—near Maiden Castle near Dorchester, on a
ram's horn.

XXV. *A new Arrangement of the Genus Narcissus.* By A. H. Har-
worth, Esq. F.L.S.

Read October 1, 1799.

THE genus *Narcissus* is at once beautiful, fragrant, and (as a vernal one,) interesting; but although it has been universally cultivated for more than a century, both in this country and on the Continent, it is still comparatively but little understood; and yet the species are neither numerous nor deficient in characteristic distinctions.

I trust, therefore, the following account of its component species, so far only as I grow them myself, will not be unacceptable to the Linnean Society. It has nothing to recommend it, but the novelty and simplicity of its divisions, and characters established by a ten years cultivation.

I possess several *Narcissi* which I have not inserted in this arrangement, not having had them long enough to discover characters sufficiently permanent.

Nearly all the *Narcissi* have bulbous roots of the tunicated kind, which are said to grow spontaneously in the southern parts of Europe, but more especially in Spain. In England we have four. For brevity's sake I shall give but one synonym to each described species, and that shall be the best: those which are new shall be marked with an asterisk.

SYNOPSIS

SYNOPSIS SPECIERUM.

NARCISSUS.

* *Petalis nectarium æquantibus.*

† *Foliis filiformibus.*

tenuifolius.

1. *N. nectario lobulato. Park. Par. 107. f. 7.*

I first met with this species and the next in the Botanic Garden of J. Symmons, Esq. Paddington.

* *inflatus.*

2. *N. nectario apice subcontracto integro, stylo exserto.*

Bulbocodium.

3. *N. nectario turgido integerrimo, stylo incluso. Curt. Bot. Mag. 88.*

†† *Foliis planis.*

minor.

4. *N. nectario apice patulo. Curt. Bot. Mag. 6.*

* *albus.*

5. *N. nectario recto apice sublobato.*

I met with this in the Botanic Garden, Brompton, about three years since.

Pseudo-narcissus.

6. *N. nectario apice crispo crenulato. Engl. Bot. 17. a most excellent figure.*

* *Sibthorpii.*

7. *N. nectario ore patulo, tubo corollæ abbreviato.*

I was informed I think by the late Mr. Curtis, from whom I had this plant, that the late Dr. Sibthorp found it wild in Oxfordshire several years since; and it is probably the *N. Pseudo-narcissus* of the *Fl. Ox.*

a blunder: from the Oxford Bot. Garden -

244 Mr. HAWORTH's new Arrangement of the Genus *Narcissus*.

bicolor.

8. *N. nectario luteo, petalis albescentibus.*

N. bicolor Linn. *Sp. Pl.* 415. excluso
synonimo *Bauh. Pin.* 52, et forte *Rud.*
elys. 2. p. 71. f. 9. quæ non vidi.

major.

9. *N. nectario amplissimo apice patentissimo in-*
ciso undulato. *Curt. Bot. Mag.* 51.

** *Petalis nectario duplò majoribus.*

† *Floribus nutantibus.*

incomparabilis.

10. *N. uniflorus, nectario plicato.* *Curt. Bot.*
Mag. 121.

* *elator.*
Calathinus Gowl.
odorus.

11. *N. subquadriflorus, nectario 6-lobulato.*

12. *N. subtriflorus, nectario apice crispo.* *Curt.*
Bot. Mag. 78.

orientalis.

13. *N. subbiflorus, nectario inciso.* *Ait. Kew.* 1,
409.

This species might probably arrange bet-
ter in the last section.

†† *Floribus cernuis.*

triandrus.

14. *N. stylo staminibusque inclusis.* *Curt. Bot.*
Mag. 48.

*** *Petalis nectario triplò majoribus.*

† *Pauciflori.*

poeticus.

15. *N. uniflorus, nectario rotato membranaceo*
crenato, petalis foliisque amplissimis. *Engl.*
Bot. 275, excellent.

angusti-

angustifolius. 16. *N. uniflorus*, nectario brevissimo crenulato, petalis foliisque gracilibus. *Curt. Bot. Mag.* 193, excellent.

A very distinct species.

biflorus. 17. *N. scapo ante florescentiam geniculato*. *Curt. Bot. Mag.* 197, excellent.

tenuior. 18. *N. subbiflorus*, foliis lineari-subulatis. *Curt. Bot. Mag.* 379.

I have known this plant several years in the Brompton Botanic Garden, when it was cultivated under the name of *uniflorus*. I first proposed the name *tenuior* to Mr. Curtis, observing at the same time that the difficulty of distinguishing it from *N. biflorus* was effectually removed by that term.

†† *Multiflori*.

Fazetta. 19. *N. nectario apice contracto integerrimo*. *Park. Par.* 81. 3.

crenulatus. 20. *N. nectario apice patente crenulato*. *Park. Par.* 81. 5.

* *tereticaulis*. 21. *N. nectario apice patente, lobulato*.

* *compressus*. 22. *N. nectario expanso crenato, foliis latis angustisque, caule valde compresso, angulis obtusissimis*.

Jonquilla. 23. *N. foliis semiteretibus*. *Curt. Bot. Mag.* 15.

XXVI. *Some Observations upon Insects that prey upon Timber, with a short History of the Cerambyx violaceus of Linnaeus.*

By the Rev. William Kirby, F. L. S.

Read November 5th, 1799.

NO part of the economy of this terrestrial globe is more worthy of admiration, or furnishes a wider field for inquiry, than the methods by which all that vast variety of substances, animal and vegetable, which are produced from the earth, are kept within their proper bounds, and, when life is departed from them, are reduced to dust; so that a due harmony of parts is preserved, the relative proportion of individuals accurately adjusted to the wants and general good of the system; and those substances which have a tendency to deform or injure it, are in due time removed out of the way, and made to contribute under another form to its support.

Not to mention man, and the various species of quadrupeds, birds, fishes, reptiles and worms, which prey on animal and vegetable life; insects, although very diminutive, are very powerful instruments, in the hands of the great Disposer of events, to promote, sometimes indeed by partial evil, the good of the whole. To them it is given in charge not only to prey on living substances, but also to hasten the dissolution and decomposition of those that are dying or dead. Of these none seem to have a more arduous task assigned them, than those whose office it is to bring on, or accelerate

accelerate the decay of the giant inhabitants of the forest. Numerous species of insects, and in various ways, labour in this department (a). Some attack living trees, others those that are dead. Some deposit their eggs in them, that, when hatched, their larva may feed upon the wood; while others seek only a place well sheltered from wet, cold, birds or other insects, for the habitation of of their young. Again, some prey upon the soundest timber; while others make no attempt upon it till it begins to decay:—but all contribute, in one way or other, to the same end; one taking up the office, where another resigns it; till that which from its bulk and solidity appeared calculated to last as long as the earth that gave it birth, by the successive efforts of various kinds of insects, is reduced in no very long time to its original dust. So powerful are the effects produced by instruments which we too often overlook or despise.

To particularize some of the species employed in this work, and to point out what trees they attack either for food, or to secure a sheltered situation for their offspring, may not be unentertaining, or altogether useless. I shall therefore mention a few of the individuals of each of the Linnæan classes, omitting *Hemiptera* and *Neuroptera*, of which I recollect no species that feed or nidificate in wood; reserving the *Coleoptera*, which class sends forth the most numerous bands of these minute pioneers of nature, to the last; and concluding the whole with a short history of the *Cerambyx violaceus* of Linnæus.

Among the *Lepidopterous* insects, the larva of the *Phalæna Bombyx*

(a) Insects are not the only labourers employed in this field; the same end is promoted by the *Alge* and *Fungi*. Witness the numerous tribe of *Lichens*, *Tremella*, *Agarici*, *Boleti*, *Auriculariæ*, *Sphæriæ*, &c. which derive their nourishment from decaying wood, and assist in its decomposition.

Coffus

Cossus is known to attain its great size by feeding upon the willow, and other kinds of wood when in a decaying state. The same tree affords nourishment, as we learn from Mr. Lewin (*a*), to the *Sphinx crabroniformis*; as does the poplar to the *Sphinx apiformis* (*b*), and *vespiformis*. The insects of the *Hymenoptera* class bring on the decay of ligneous substances in various ways. The nests and cells of many of the genuine *Vespæ* are made of a kind of paper formed of the filaments of wood. I have often been highly amused by seeing the common wasp, which, though a mischievous, is at the same time a very ingenious animal, employed in scraping gate-posts with her strong maxillæ, to collect materials for this purpose; a sight which Reaumur informs us it was long before he could enjoy (*c*). The *Hornet* frequently perforates hollow trunks, to build her paper metropolis in a sheltered situation (*d*). The *Leaf-cutter* bees, of which there are several species all confounded under the common name of *A. centuncularis*, in order to place their *centunculi* (*e*) of curious construction, in perfect security, make their way into the body of various trees. One species selects the willow for this purpose (*f*), another the oak (*g*), or the elm indifferently. *Apis*

(*a*) *Linn. Transf.* Vol. iii. p. 2.

(*b*) *Ibid.* p. 1.

(*c*) *Reaum. Tom. vi. Mem. vi. p. 180, 181.*

(*d*) *Ibid. Mem. vii. p. 217.* I am informed by my friend Sir Thomas Cullum, whose spirit and accuracy of observation throw light upon every branch of Natural History, that in the year 1785, in Mr. Porte's gardens at Ham near Dovedale, the hornets destroyed a great number of the young oaks by making their way into their heart, and there building their nests.

(*e*) *Ibid. Mem. iv. Tab. 9. fig. 8—181. Tab. 10.* Reaumur's species makes its nest under ground; but Geoffroy's (*Hist. ab. des Inf. Tom. ii. p. 410. n. 5.*) and our English ones make theirs in the trunks of trees.

(*f*) *Raii Hist. Inf. p. 245.* Sir E. King, in *Philos. Transf.* abridged by Lowthorp, Vol. ii. p. 773. Willoughby in *Do.* p. 773, 774. Dr. Martin Lister in *Do.* 774.

(*g*) *Apis centuncularis, Donovan Brit. Inf. Vol. iv. Tab. 120.*

maxillofa (a) nidificates in posts and rails. *Apis violacea*, as we learn from Reaumur (b), constructs curious cells for its young, of several stories, in the supports of espalier trees. *Apis furcata* (c) makes similar cells in decaying wood. Many other insects of this class, particularly *Spheges*, and illegitimate *Vespa*, emerge from cylindrical holes in trees and posts, in which they were nourished in their larva state.

Of *Dipterous* insects, the *Tipula pectinicornis*, singular for the branching antennæ of the male, and many other species of that genus, in their larva state, inhabit putrescent wood (d): and a numerous army of the *Oniscus Asellus*, to name no other insect in the *Aptera* class, is generally to be met with in those parts of decaying trees under the bark, which are deserted by other insects; upon which, from its saw-dust-like excrement, it appears to feed.

Having gone over the other classes, it remains that we mention the devourers of wood amongst the *Coleoptera*. Foremost in the ranks comes the gigantic *Lucanus Cervus*, whose larva feeds upon the decaying wood of the oak (e) and the elm. In the latter is also found the *Lucanus inermis* (f). The ash affords nourishment both to *Lucanus parallelipipedus* and *L. cylindricus*. (*Scarabæus cylindricus* of Linn. but surely a true *Lucanus*.) The several species of the genus *Ips* (*Bostrichus* Fab.) feed upon timber between the bark

(a) Marsham in *Linn. Transf.* Vol. iii. p. 27, 28.

(b) Reaumur, Tom. vi. Mem. ii. Tab. 5.

(c) *Furcata*. A. cinereo pubescens; atra; antennarum articulo primo, fronte, labioque flavis: abdomine apice furcato; tarsis ferrugineis. *Panzer. Fn. Inf. Germ. Init.* No. lvi. Tab. 8. *Obs.* Panzer's insect is the male of this species.

(d) Habitat in carie arborum solitaria larva, pupaque. *Schrank. Enum. Inf. Austr.* p. 423. n. 853. I have found the pupa in the same situation.

(e) In Europæ ligno quercino putrido. *Linn. Syst. Nat.*

(f) *Inermis*. 2 *L. scutellatus*, convexus, brunneus, maxillis brevibus dente laterali elevato. Marsham M. S.

and the wood, upon the surface of which they usually trace in feeding, what Linnæus calls pinnated labyrinths, in which a number of lateral lines, nearly parallel with each other, form right angles on each side, with a central one; and thus the bark is finally separated from the wood. Most trees, I imagine, have a particular species of this genus assigned to them. Thus *Ips piniperdus* attacks the fir. *Ips Scolytus*, the elm. *Ips niger* (a), *I. griseus* (b), *I. rufescens* (c), and, I believe, *I. nebulosus* (d), undertake the barking of the ash. *Ips fuscus* (e), and probably more species, feed upon the oak. Even shrubs do not escape, for whin or furze (*Ulex europæus*) is preyed upon by the minute *Ips rhododactylus* (f), which I have frequently taken coming out of the larger sticks of a dead whin-fence in my own garden. Next to these come the *Ptini*; several species of which are found in wood. I meet with *Ptinus tessellatus* in the willow, and I believe it will attack deal or any soft wood. It is one of those insects that is called the death-watch, from a certain sound which it makes at regular intervals resembling the clicking of a watch, which, the vulgar superstitiously imagine, forebodes the death of some person in the house in which it is heard. The *Ptinus pectinicornis* also, and *Pt. cylindricus* (g), feed in the same tree.

(a) *Niger*. 24. *I. subcylindricus*, niger, thorace punctulato, elytris crenato-striatis, plantis piceis. Martham M.S.

(b) *Griseus*. 9. *I. ferrugineus*, capite nigro, supra ferrugineo testaceoque varius. Ibid.

(c) *Rufescens*. 10. *I. subtus luteus*, supra rufus, elytris luteo nebulosis. Ibid.

(d) *Nebulosus*. 8. *I. subvillosus*, corpore nigro cinereoque vario. Ibid. *Bostrychus Fraxini*: ater fusco cinereoque varius, elytris punctato striatis, antennis testaceis clavâ cinereâ acutâ. Panz. *Fn. Inf. Germ. Init.* n. 66. tab. 13.

(e) *Fuscus*. 5. *I. fuscus*, antennis pedibusque testaceis; elytris retusis confertius punctulatis. Martham M.S.

(f) *Rhododactylus*. 22. *I. niger*, villosus totus, plantis rufis. Ibid.

(g) *Cylindricus*. 6. *Pt. subcylindricus* fusco ferrugineus; thorace gibbo læviusculo; antennis pedibusque rufescentibus. Ibid.

But of all the species of this genus, *Ptinus pertinax* is the most mischievous; any kind of wood that begins to have a tendency to decay, it attacks without mercy. I speak this from experience, having a chamber in my house, the floor of which is quite filled and perforated in every direction by this destructive little insect; and my walnut-tree chairs it has nearly reduced to the same state that Linnæus observes it had done his (a).

Amongst the *Curculiones*, the late ingenious Mr. Curtis has informed us, that *C. Lapatii* feeds upon the willow (b). *C. lignarius* (c) preys upon the trunk of putrid elms; and *C. atramentarius* (d) I have found in all its states in old rails under bark.* There is one insect, which although not as yet discovered in England, ought not to be passed over, as its history furnishes a striking proof how useful the study of Natural History may be made when applied to *Æconomics*: the insect I allude to is the *Cantharis navalis* of Linnæus. Our president, the liberal possessor of the Linnæan treasures, informs me, from the *Iter Westrogothicum*, that the oak timber in the royal dock-yards in Sweden being observed to have suffered considerable injury from some unknown animal, Linnæus was desired by His Swedish Majesty to trace out the cause, and point out some remedy which might prevent the further progress of so alarming an evil. Upon inquiry he discovered that the mischief was occasioned by this *Cantharis*, and he recommended that the timber should be immersed in water during the usual time of this insect's

(a) Terebravit et destruxit sedilia mea. *Linn. Syst. Nat.*

(b) *Linn. Transf.* Vol. I. p. 86.

(c) *Lignarius*. 113. *C. nigro-piceus* totus, rostro crassiusculo, thorace punctato, elytris abbreviatis. Marlham M.S.

(d) *Atramentarius*. 165. *C. ater* obovatus, thorace utrinque unidentato, elytris striatis. *Ibid.*

appearance. This advice was pursued, and the dock-yard timber received no further injury.

We have so few species of the genus *Buprestis* in England, and those that we have are so seldom met with, that it is no wonder if the habitation of their larvæ is not commonly known; both De Geer (a), and Geoffroy (b), however, are of opinion that they are inhabitants of wood. But the timber-merchant and the builder have no greater enemies than the genuine *Cerambyces*, under which genus I would, with De Geer (c), include those only which have reniform or lunar eyes, excluding *C. Cursor*, *Lamed*, *meridianus*, *Inquisitor*, &c. and taking in *Leptura Alni*, *arcuata*, *arietis*, *mystica*, *præusta*, &c. of Linn. These insects, as far at least as we are acquainted with them, not only devour the surface of the wood that lies under the bark, but penetrate deep and in all directions into the solid timber. What havock must the larva of so large an insect as *Cerambyx coriarius* make in an oak tree (d)! I have taken the pupa of *Cerambyx arcuatus* out of the heart of a solid piece of the same timber, which had been perforated by that insect in all directions. Once in the height of summer, when the mid-day sun shone out warm, I was very much entertained with seeing several of these fine insects fly down upon a pollard oak that had been felled and the bark left upon it, and run all over it with great velocity, seeking, it is probable, a place proper for depositing their eggs.

Amongst the *Cerambyces* of this country, the ingenious Mr. Donovan, in his elegant work upon British Insects (e), has figured *C. vio-*

(a) *De Geer*, Tom. iv. p. 131.

(b) *Geoffr.* Tom. i. *Cucujus*. n. 1. p. 125. n. 2. p. 126.

(c) *De Geer*, Tom. v. p. 55, 56.

(d) Habitat in *betulis putridis*. *Linn. Syst. Nat.* But I have known it cut out of an oak.

(e) *Donov. Brit. Inf.* Vol. ii. p. 73. Tab. 61. fig. 1.

laceus, and informs us that it probably feeds upon the fir, but at the same time expresses a strong suspicion that this beautiful insect is not originally English. How far this may be true, it is not my intention to inquire; I shall only observe, that it is now become but too common, at least in one spot, in the neighbourhood of London, as will appear from those circumstances of its history which I am going to relate.

My friend and relation Mr. James Trimmer of Old Brentford (a), an attentive observer of nature, more particularly of the economy and habits of insects, and to whom I am indebted for much curious and interesting information in this branch of science, some time ago wrote to inform me, that he had found this insect in its three states in fir-timber, and accompanied this intelligence with many ingenious remarks. Expecting him soon to visit me at Barham, in my answer I requested him to bring with him some of its *larvæ* and *pupæ*, and also some pieces of the wood upon which they had been feeding; at the same time I desired him to continue observing their motions. What follows relative to the history of this *Cerambyx* is chiefly compiled from his communications, which I thought too interesting to be lost.

The fir in which Mr. Trimmer first found this insect was of English growth, of the spruce kind, which had not been felled many years, and had originally grown near the spot on which the building was erected in which it was employed: it did not appear to have been attacked more than two years when Mr. Trimmer made his observations; and it suffered most in 1798, when the *larvæ* had multiplied so much, and been so extremely voracious as to have left very little food for another year. Some Scotch fir in an

(a) Son of Mrs. Trimmer, so justly celebrated for her humane and successful exertions to procure the great blessing of a religious education for the children of the poor.

adjacent building had also been attacked by them. Nor does this insect so entirely confine itself to fir, as never to attack any other kind of wood; for, when the *imago* first came forth in considerable quantities, Mr. Trimmer took several and placed them upon some pieces of fir which were under cover: but, what seems remarkable, the insects quitted these, and went and deposited their eggs in some pieces of apple, pear, cherry and plum, which had been selected for turning, and were piled up in the open air.

It is worthy of observation, that this destructive little animal attacks only such timber as has not been stripped of its bark; a circumstance which ought to be known and attended to by all persons who have any concern with this article; for the bark is a temptation, not only to the insect in question, but also to a numerous tribe both of this and other genera; and a great deal of the injury which is done to timber would be prevented, if other trees besides the oak were barked as soon as they are felled. The principal danger, however, arises from neglecting this precaution with respect to such timber as is used in buildings, especially in those places that are accessible to insects, for in this case it will not last out half its time.

But, to proceed with our history, the female of this insect is furnished with a flat, retractile tube, or rather aculeus (*a*), which she inserts, it should seem, (for Mr. Trimmer was never so fortunate as to see this operation performed,) between the bark and the wood to the depth of about a quarter of an inch, and there she deposits her egg, since not more than one appears to be laid in one place. By stripping off the bark it is easy to trace the whole progress of the *larva*, from the spot where it was newly hatched, to that where it has attained its full size (*b*). At first it proceeds onwards,

a) Tab. 12. fig. 15. c.

(*b*) Fig. 13. a—c.

but

but in a serpentine direction, filling the space which it leaves behind it with its excrement, resembling saw-dust, and so stopping all ingress to enemies from without; but when it has arrived at its utmost dimensions, it does not confine itself to one direction, but works in a kind of labyrinth, eating backwards and forwards, which gives the wood under the bark a very irregular surface (*a*); by this mean its paths are of considerable width. Its attacks are not confined to the solid timber, but in its progress it eats away an equal portion of the bark. The bed of those paths where it has been at work, exhibits, when closely examined, a curious appearance, occasioned by the erosions of its maxillæ, which excavate an infinity of little ramified channels. When the insect is about to assume the *pupa*, it bores down obliquely into the solid wood, to the depth sometimes of three inches, seldom if ever less than two. These holes (*b*) are nearly semicylindrical, expressing exactly the form of the grub. One would wonder how so small and seemingly so weak an animal could have strength to excavate so deep a mine: but when we see its maxillæ, our wonder ceases; these are large, thick, and solid sections of a cone divided longitudinally (*c*), which in the act of mastication apply to each other the whole of their interior plane surface, so that they grind the food of the insect like a pair of millstones. Early in March all the *larvæ*, except some sickly ones, were observed to have entered the wood in this manner; some began so soon as October. At the place in the bark opposite to this hole, the *imago* gnaws its way out of its prison when it makes its appearance, which took place first on the 20th of May, and continued till about the 20th of June; it returns by the same passage which the *larva* had excavated previous to assuming the *pupa*.

(*a*) Tab. 12. fig. 14.

(*b*) Fig. 14, a a a.

(*c*) Fig. 5. b b. Fig. 7. b.

Mr.

Mr. Trimmer thinks that these insects fly only during the night, as in the day-time he always found them standing upon the piece of wood from which they had been disclosed. The case is different with *Cerambyx arcuatus*, which, as I observed before, flies at mid-day: but perhaps this circumstance may depend much upon the state of the atmosphere, or the hour of the day; for many insects have their certain hours for flying; a singular instance of which I had once an opportunity of witnessing. In the beginning of July 1793, about ten o'clock in the morning, as I was passing through a meadow, I was surprised with the appearance of what at first seemed to me to be myriads of bees flying about the hedges and trees; but, upon taking some of them, they proved to be *Scarabæus argenteus* (*Melolontha argentea* Fab.); upon my return through the same field, a little after noon, I was astonished to find that of this infinite host of insects not a single one was to be seen.

I have now communicated all the observations which Mr. Trimmer made with respect to the history of this insect; these I hope will not be thought unworthy of the attention of the Linnean Society, since they furnish an useful lesson in Œconomics, and supply an additional proof of the utility of the study of Natural History, and to what good purposes it may be directed.

Mr. Trimmer, when he came to Barham, brought with him specimens of this insect in all its states, as also some pieces of the wood that had been attacked by it, from which I employed my ingenious friend the Rev. Peter Lathbury, F.L.S. to make the drawings which accompany this paper. Nothing now remains but to close this account with a description of each state of the insect.

CERAMBYX

CERAMBYX.

Thorace inermi subrotundo, f. ex globoso depresso.

violaceus. 70. C. thorace mutico subrotundo pubescente, corpore violaceo, antennis mediocribus. *Linn. Syst. Nat. ed. 12. p. 635. n. 70. Fn. Succ. ed. 2. n. 667. Vill. Ent. Eur. tom. 1. p. 247. n. 71. Schrank. Enum. Inf. Austr. p. 147. n. 277. Poda Mus. Græc. p. 36. Fn. Frid. n. 130.*

C. violaceus nitens; corpore, thoraceque mutico subrotundo, depresso; femoribus clavatis, antennis mediocribus nigris. *De Geer. tom. 5. p. 88. n. 24.*

C. thorace subpubescente corpore violaceo antennis brevibus. *Lin. Syst. Nat. Ed. Gmel. p. 1848. n. 70. Callidium violaceum. Fab. Ent. Syst. Em. tom. 1. par. 2. p. 320. n. 9.*

Cantharis nigra thorace rotundato, elytris cæruleiscentibus. *Gadd. Diff. 28.*

Stenocorus violaceus. *Scop. Ann. Hist. Nat. V. p. 97. 59.*

FIGURÆ. *Frisch. Inf. 12. tab. 3. icon. 6. fig. 1.*

Schæff. Ic. tab. 4. fig. 13.

Oliv. Inf. 70. tab. 7. fig. 77.

Herbst. Arch. tab. 26. fig. 10.

Ræmer. Gen. Insect. p. 9. tab. front. fig. 2.

Donovan. Brit. Inf. vol. 2. p. 73. tab. 61. fig. 1.

LONG. CORP. a lin. $4\frac{2}{3}$ ad lin. $7\frac{1}{2}$.

DESCRIP. *Larva* (a) apoda, pallida, plicata, subpilosa, supra convexa, subtus planiuscula, caput versùs incrassata, segmentorum tredecim. *Caput* (b) magnum convexum, antennulâ (c) triarticulatâ, pilosulâ, utrinque instructum. Os rufescens, labio (d) apice rotundato ciliato supernè clausum: labio inferiori (e) trifido, lobis lateralibus palpo unico (f), intermedio duobus (g), instructis. *Maxillæ* (h) horizontales, fuscæ, semiconicæ, validissimæ, per totam superficiem planam interiorem conniventes.

Pupa (i) incompleta, oblonga, pallida; omnes imaginis partes, membranâ tenuissimâ tectas, exhibens.

Imago (k). *Corpus* piceo-nigrum subpilosum; supra violaceum, excavato-punctatum, punctulis creberrimis confluentibus. *Caput* magis exsertum quam in reliquis genuinis Cerambycibus nostratibus. *Maxillæ* arcuatæ apice conniventes. *Palpi* quatuor capitati, clavâ compressâ truncatâ, exterioribus longioribus. *Antennæ* subsetaceæ, corpore subbreviares, atro-violaceæ pilosulæ, articulis ultimis subtomentosis nigris. *Oculi* lunares basin antennarum ponè amplexantes. *Gula* nitida. *Thorax* ex globoso depressus, latior quam longus, f. lateribus gibbis. *Sternum* violaceum, mucrone brevi instructum. *Scutellum* medio depressum. *Elytra* linearia vix marginata, e violaceo nitentia ac velut aurata, apice rotundata humeris gibbis. *Alæ* fuscescentes; nervis,

(a) Tab. 12. fig. 4.

(b) Fig. 5, b.

(c) Fig. 5, a a; and fig. 8, b.

(d) Fig. 7, a; and fig. 12.

(e) Fig. 9.

(f) Fig. 10. h.

(g) Fig. 11, a a.

(h) Fig. 5, b b; fig. 7, b; fig. 8, c.

(i) Fig. 2, 3.

(k) Fig. 1.

margineque

margineque crassiori, nigris. *Abdomen* supra planiusculum, subtus convexum. *Pedes* atrii, interdum atro-violacei, femoribus clavatis apophysi biarticulata insidentibus: tarsi nigri quadriarticulati, unguibus rufescentibus.

Variat capite thoraceque virescentibus, aliquando supra totus virescens.

EXPLANATION OF TAB. XII.

- FIG. I. *Imago* of *Cerambyx violaceus*, natural size.
2. *Pupa* of ditto, the upper-side.
 3. — ditto, the under-side, to shew the mode in which the antennæ are folded.
 4. *Larva* of ditto, a small specimen, and rather shrunk for want of food.
 5. — upper side of the head magnified. (a a) Its antennulæ. (b b) Its maxillæ.
 6. — the under side of the head.
 7. — a portion of the head greatly magnified. (a) The upper lip. (b) Maxilla.
 8. — a longitudinal section much magnified, to shew the folds of the abdomen more distinctly. (a) The head. (b) The antennula. (c) The maxilla.
 9. — under-side of the head much magnified, to shew the under lip. (a a) Its lateral lobes. (b b) Their feeler. (c) The intermediate lobe. (d d) Its feelers.
 10. — one of the lateral lobes of the under lip exhibited separately, much magnified. (a) Its summit rounded and fringed with hair. (b) Its feeler.

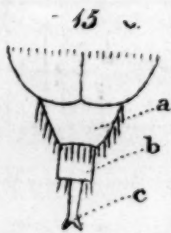
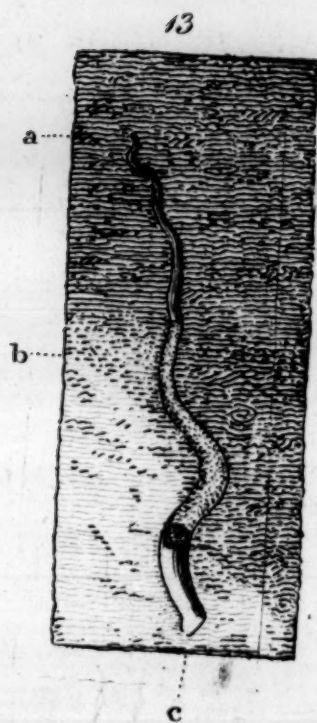
FIG. 11. *Larva*—the intermediate lobe of the under lip. (a a) Its feelers.

12. ——— the upper lip much magnified. (a) Its summit round and fringed.

13. A portion of the wood with the bark taken off, to show the progress of the larva from its being first hatched till it begins to work in all directions. (a-c) The serpentine path of the insect. (a) The point where the egg was hatched. (b) The excrement of the insect preventing all access to it.

14. A portion of wood of irregular surface, upon which the larvæ have been long at work. (a a a) Semicylindrical holes where it has bored down into the solid wood.—A specimen of this sent to the Society.

15. Anus of a female, to shew the instrument by which she is enabled to introduce her eggs between the bark and the wood. (a) The anal segment of the abdomen. (b) A flat vagina, into which I suppose the aculeus is withdrawn when unemployed, and which itself is retractile within the anal segment. (c) The aculeus flat and bifid at its apex.





XXVII. *Description of the Vespertilio plicatus.* By Francis Buchanan,
M.D. A.L.S.

Read November 5, 1799.

VESPERTILIO PLICATUS.

Section F of Ker's Translation of Gmelin's Syst. Nat.

Tailed; the nostrils round, simple perforations: the upper lip very large, and folded: the ears as large as the head, folded, and half pendulous.

Inhabits old houses at Puttahaut in Bengal.

FROM its teeth this bat can only be mistaken for the *Cephalotes*: but the description of that species will not apply to this.

From the point of the nose to the root of the tail 3 inches: from the extremity of one wing to that of the other 12 inches.

The *wings*, and naked parts of the body, are foot-coloured. The hair is mixed with ash-colour, and is paler below than on the back.

The *head* is large, thick at the shoulders, and tapers gradually to the *snout*; which is blunt, terminates in a heart-shaped margin, and projects far beyond the lower jaw. It is mostly naked; but has several long, erect bristles. The *nostrils* are small circular holes, remote from each other, and placed under the margin of the snout.

The *upper lip* at the sides hangs over the under jaw, and at each side is deeply wrinkled with seven or eight vertical folds. The *ears* are large, blunt, wrinkled, and somewhat pendulous. From being bent in several folds, they at first sight appear to be thick and fleshy. They approach very near at their insertion on the brow, and are naked, except on a sharp sinus towards the hinder part of the head. On their edge near the tips are five or six small warts. There are no internal auricles. The *eyes* are in two small slits above the angles of the mouth, and are almost covered by the ears. There are two strong *tusks* in each jaw. In the upper jaw there are two conical sharp *fore-teeth*, half as long as the tusks. Below, in place of these, there are only two small points, scarcely projecting from the gums. The *grinders* are a little removed from the tusks, and are in each side of each jaw five or six in number. In the lower jaw each grinder has two sharp points; in the upper jaw each, except the first pair, has three points.

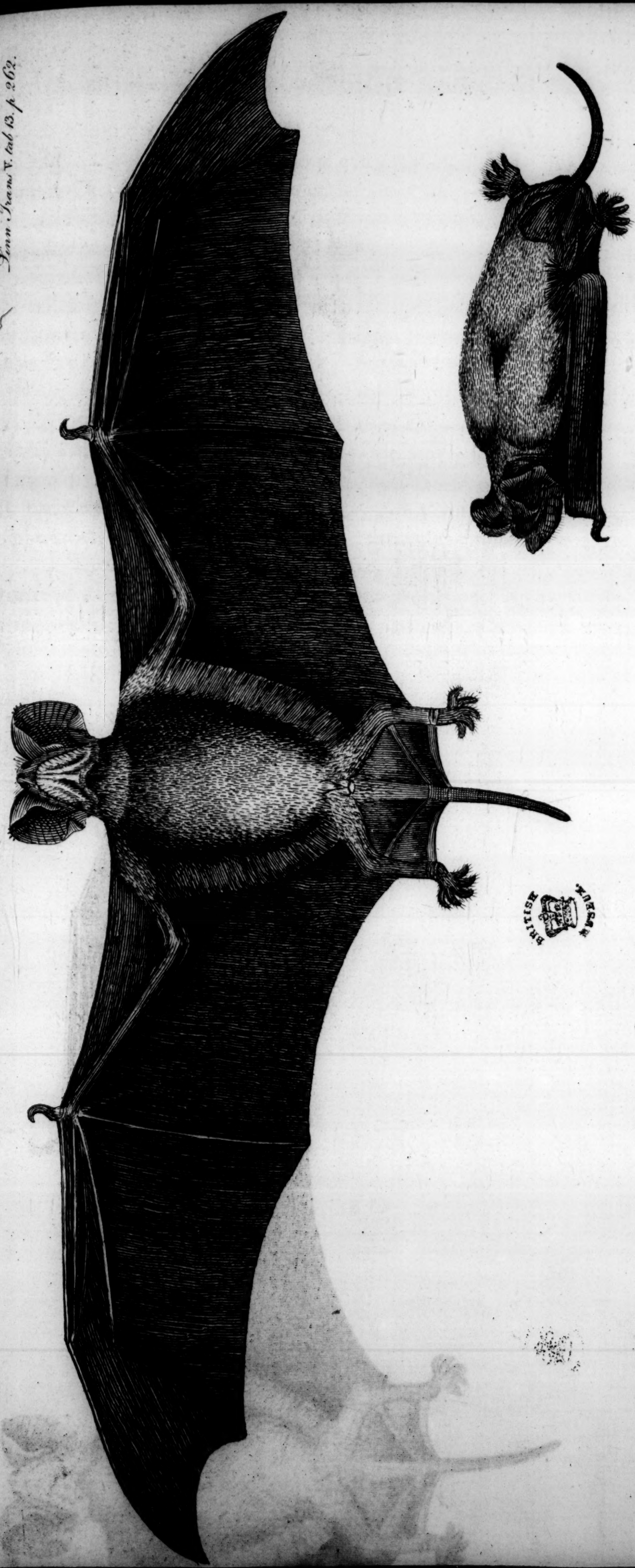
The *neck* is very short, and so covered with hair as to be scarcely observable. The *shoulders* are high, and round, with a deep cavity between them. The *body*, at the shoulders, is much wider than at the haunches. The *buttocks* are bare.

The *tail* is naked, round, and blunt: it is turned up at the end. A strong hooked *claw* in place of the thumb. No carpus nor metacarpus. Four long *fingers* serve to distend the membrane of the wing. The *hind-feet* have five distinct toes, with small sharp claws. The *membrane* of the *wings* joins the hinder legs and tail, but it is not nearly so long as the latter. A broad *hairy list* surrounds all round the body, and covers the bottom of the membrane.

The drawing and description was taken from a male. I could observe no nipples.

The

Linn. Trans. V. tab. 13. p. 262.



Vespertilio plicatus.

The natives of Bengal have only two names for all the species of bats found in their country. The large bats, which nestle on trees, and live chiefly on fruit, they call Bādūr: those which, like the one above described, inhabit caverns and old buildings, and live chiefly on insects, they call Chamchēeka.

TAB. XIII. represents the *Vespertilio plicatus* of its natural size.

XXVIII. *Descriptions of five new British Species of Carex.* By James Edward Smith, M.D. F.R.S. P.L.S.

Read December 3, 1799.

AFTER so copious a harvest of British Carices as that with which my learned friend Dr. Goodenough has enriched the second and third volumes of our Transactions, no great acquisitions of the same kind are to be expected. The gleanings only of this ample and well-cultivated field, so lately an impenetrable wilderness, have fallen to my lot; and though but about the tithe of the crop, I have spared no pains to collect and methodize them. The value of such discoveries increases in proportion to what we have already obtained; and I am very well aware how much I am indebted, for their perspicuity and certainty, to the clue my predecessor had left me.

In labouring at the genus *Carex* for the Flora Britannica, I have, as in every other instance, examined the subject throughout, without taking any thing for granted; but in no tribe of equal intricacy have I found so little at present to correct. What I am now about to offer is chiefly the description of 5 species, in addition to the 47 described by Dr. Goodenough. For the discovery of these I am entirely obliged to the friends whose names will hereafter appear. I have only to answer for the specific determination of 4 of them. Of the preceding 47 species the *Carex axillaris* only has not come so completely under my examination as I could have wished, though

though I have found no reason to doubt its being sufficiently different from all others. *C. fulva* appears, notwithstanding Dr. Goodenough's correction, *Transf. of Linn. Soc.* v. 3. 77, to be very distinct from *flava*, having longer vaginæ (which however are shorter than the flower-stalks), oval spikes, the fruits erect, not recurved, and a rough stem. Its habit too differs, approaching towards that of *C. distans*; but its glumes being perfectly awnless, keep it from being confounded with any variety of the last-mentioned. In my arrangement of the species I have taken the liberty of making some alterations, disposing them according to their natural affinities, rather than their technical characters. In the generic character I have adopted an alteration lately suggested to me by Dr. Goodenough himself, calling the permanent husk that invests the seed an *arillus*, a name which I cannot help thinking expresses its true nature much better than the hypothetical one of *nectarium*, the erroneous one of *capsula*, or even the analogical denomination of *corolla*. The generic character will therefore stand as follows :

Masc. *Amentum* imbricatum. *Cal.* gluma univalvis. *Cor.* nulla.

Fœm. *Ament.* imbricatum. *Cal.* gluma univalvis. *Cor.* nulla.

Stigmata 2 vel 3. *Semen* arillo ventricoso tectum.

My new species belong to the first, third, and fourth sections of the genus.

* *Spicâ unicâ simplici.*

I. CAREX *Davalliana.*

Prickly separate-headed Carex.

C. spicâ simplici dioicâ, fructibus lanceolato-triquetris nervosis patenti-deflexis: angulis apice scabris.

Carex dioica. Wilden. Car. Berol. 16, ex descr.

C. n. 1350. Hall. Hist. v. 2. 182.

Gramen cyperoides, spicâ simplici cassâ. Scheuchz. Agr. 497. t. II. f. 9, 10; synonymis omninò erroneis.

In uliginosis. Fl. Maio, Junio.

Discovered in marshy ground in Mearns-shire, North Britain, by Professor James Beattie jun. of Aberdeen.

Radix fibrosa, cæspitosa. Culmi simplicissimi, triquetri, scabriusculi, quandoque scaberrimi, monostachyi, basi foliosi, parùm altiores quam in C. dioicâ verâ. Folia setacea, triquetra, culmo triplò breviora. Spicæ dioicæ, lineares, erectæ, multifloræ, vix unciales, glumis fuscis, carinatis, acutis, margine scariosis. Stamina capillaria, exserta, antheris flavis, linearibus. Fructus lanceolato-triquetri, nec gibbi, rostrati, undique nervosi, angulis apice scabris, ore scarioso, integro, demùm deflexo-patentes, acuminati, unde spicæ feminiferæ squarrosæ fiunt.

Specimens of this Carex were sent to me from Switzerland, as well as to Dr. Goodenough, (see his postscript at the end of our 2d volume,) by my much lamented friend the late Mr. Davall, who discovered

discovered it to be different from the Linnæan *dioica*, to which the synonym of Scheuchzer is referred in the *Species Plantarum*. Linnæus, however, has erased this quotation from his own copy of that work. Mr. Davall has assured me this plant is very common in almost every damp spot about Orbe; whereas he had met with the *dioica* only in one peat bog. I have no doubt of its being what Haller intended under his n. 1350; it agrees exactly with his description, though he has confounded under it synonyms of *dioica* and *pulicaris* at least, if of no more species. It appears to be the *dioica* described by Professor Willdenow in his recent treatise on the Carices found about Berlin, printed in the Transactions of the Academy of that place. Scheuchzer erroneously applied to it synonyms of Ray which belong to *C. pulicaris*, and has by that means been the cause of subsequent mistakes. Mr. Davall having first elucidated the subject, I have consecrated the specific name to his memory.

No one had suspected this to be a British plant till I received a specimen this autumn from Professor Beattie of Aberdeen, under the name of *dioica*, along with a rich assemblage of great part of the whole genus.

C. Davalliana is readily and essentially distinguished from *C. dioica* by the fruit being of a triangular-lanceolate, not ovate, form, reflexed, not erect, and also much more strongly nerved. No one who has examined both can ever confound them. *C. pulicaris* is distinguished by being always androgynous, and having fruit altogether without nerves, lanceolate, and pointed at each end.

*** *Spicis sexu distinctis: masculâ unicâ, rariùs geminâ: bracteis foliaceis et plerumque vaginantibus.*

2. CAREX *binervis.*

Green-ribbed Carex.

C. vaginis elongatis pedunculo brevioribus, spicis cylindricis remotis subcompositis, glumis mucronulatis, fructibus binervibus.

Carex distans. Lightf. 561, ex descr.

In ericetis siccioribus. Fl. Junio.

Very common on the driest moors about Aberdeen. Prof. Beattie.

Near Edinburgh. Mr. J. Mackay.

Radix fibrosa. Culmus erectus, firmus, sesquipedalis, bipedalis, vel tripedalis, obtusè triqueter, lævis, apicem versùs hinc scaber. Folia erecta, latiuscula, acuminata, glaucescentia, marginibus carinâque aspera. Bractea foliis simillimæ, elongatæ, erectæ, longiùs vaginatæ, remotæ. Spica mascula utrinque attenuata, sæpè sesquiuncialis, multiflora, glumis densissimè imbricatis, ellipticis, obtusis, submucronulatis, nigricantibus, carinâ acutâ, virenti; fœmineæ tres aut quatuor, rarissimè quinque, sparsæ, cylindricæ, erectæ, inferiores remotissimæ, longiùs pedunculatæ, atque sæpiùs basi compositæ seu ramosæ, quandoque omnes superne masculæ. Glumæ fœminearum ovatæ, nigræ, mucronulatæ, carinâ virenti, glabrâ, mucronulo scabro. Fructus glumis longiores, ovati, vix rostrati, glabri, nitidi; intùs apiceque sanguineo-fusci; extùs pallidi, nervis duobus lateralibus viridibus præcipuè conspicuis. Semen acutè triquetrum, albidum.

This

This species appears to have been confounded with *C. distans*; and from Lightfoot's description of the green angles of the fruit, I presume it to have been what he intended under that name. It is considerably larger than the real *distans*, the spikes black intermixed with green rather than yellowish, and the female ones often branched or compounded at their base. Its most essential and decisive character however consists in the two strong deep-green nerves or ribs which run along each side of the fruit externally near the edge. The arillus is also broader and more compressed than in *C. distans*.

3. CAREX tomentosa.

Downy-fruited Carex.

C. vaginis brevissimis, spicis foemineis subsessilibus cylindraceis obtusis, glumis ellipticis acutis, fructibus tomentosis.

Carex tomentosa. Linn. Mant. 123. Leers. 200. t. 15. f. 7. Willden. Car. Berol. 24. Dickf. Dr. Pl. 43.

In pratis rariùs. Fl. Junio.

In meadows near Merston Measey, Wiltshire. Mr. Teesdale.

Radix repens. Culmus pedalis, erectus, nudus, acutè triqueter, angulis supernè scabris. Folia culmo breviora, erecta, plana, lætè viridia, utrinque margineque scabra. Bracteæ foliaceæ, erecto-patentes, culmum vix superantes, vaginâ brevissimâ, aut ferè nullâ. Spica mascula lanceolata, obtusiuscula, glumis lanceolatis, ferrugineo-fuscis, carinâ virenti, superioribus quandoque mucronulatis; foemineæ plerumque duæ, parùm remotæ, brevissimè pedunculatæ, cylindraceæ, obtusæ, longitudine variæ, glumis elliptico-ovatis,
vix

270 Dr. SMITH's Descriptions of five new British Species of Carex.

vix mucronulatis, ferrugineo-fuscis, carinâ latè virenti. *Fructus* longitudine circiter glumarum, densè imbricati, subrotundi, parùm compressi, vix triquetri, virides, tomento densissimo, brevi, albido, demùm aureo, undique vestiti. *Semen* albidum, obsoletè triquetrum.

Dr. Goodenough has shown that the *C. tomentosa* of Lightfoot and Hudson is the *filiformis* of Linnæus. I have now the pleasure of giving the real *tomentosa* a place in the *Flora Britannica*, on the authority of wild specimens gathered in Wiltshire last summer, by my friend Mr. Teesdale, F.L.S. Those in Mr. Dickson's *Dried Plants*, n. 43, were all sent from Switzerland. It is most akin to *præcox* and *pilulifera*, (both which have the fruit in some degree pubescent,) but is a much larger species, and if the specific character be attended to, cannot be confounded with any other. The red *vaginæ* of the radical leaves, as in *C. digitata*, are very striking at first sight.

**** *Spicis sexu distinctis : masculis pluribus.*

4. CAREX *Micheliana*.

Blunt-fruited Black Carex.

C. spicis erectis cylindricis : fœmineis pedunculatis, glumis omnibus obtusis muticis, fructibus obovatis obtusissimis.

Cyperoides foliis caryophylleis, caule exquisitè triangulari, spicis habitioribus, squamis curtis obtusè mucronatis, capsulis turbina-
tis brevibus confertis. *Mich. Gen. 62. t. 32. f. 12.*

In aquosis. Fl. Maio?

Near Aberdeen. *Prof. Beattie.*

Culmus

Culmus erectus, pedalis aut sesquipedalis, triqueter, striatus, vix scaber. *Folia* erecta, acuminata, marginibus aspera, carinâ leviusculâ. *Bractea* foliaceæ, erectæ, culmum superantes, haud vaginatae, basi auriculatæ, auriculis magnis, rotundatis, connatis, fuscis, apice pallidis. *Spica* cylindricæ, obtusiusculæ, erectæ; masculæ tres aut quatuor, subsessiles, graciles, glumis obtusissimis, muticis, glauco-fuscis, margine tenui, scariofo, niveo; foemineæ duæ, longius pedunculatæ, crassiores, superior apice mascula, inferior basi interdum composita, glumis ellipticis, obtusissimis, muticis, fuscis, margine scariofo, albo, carinâ flavescente, obtusâ. *Stigmata* tria. *Fructus* glumis multò breviores, obovato-triquetri, dilatati, ferè enerves, glabri, virentes, apice obtusissimi, indivisi. *Semen* triquetrum, breve, fuscum, angulis pallidis.

I cannot but confess that it was with extraordinary pleasure I detected a specimen of this *Carex* among many supposed varieties of *recurva* communicated by Professor Beattie; for I immediately perceived its striking agreement with that long-doubtful figure of Micheli, *tab. 32. f. 12*, which has been sometimes referred to *acuta*, sometimes to *stricta*, and hitherto found to agree well with no known species. As I believe no one but Micheli has described or distinguished this plant, I have given it his name. His definition above-quoted will be found precisely to accord with it, and I trust my specific character and description will prevent its being mistaken in future. It is most allied to *C. recurva*, (which sometimes varies with numerous male spikes,) but the perfectly smooth fruit, shorter than the glumes, and rather compressed, by no means gibbous, clearly distinguishes *C. Micheliana*; not to mention its greater size, and erect female spikes, the lowermost of which is liable to be branched at the base, as in *C. binervis*.

5. CAREX *lævigata*.

Smooth-stalked Beaked Carex.

C. spicis cylindricis: fœmineis pedunculatis, vaginis longissimis, glumis acuminatis, fructibus triquetris rostratis bifurcis.

In paludibus. Fl. Maio.

In a marsh near Glasgow, 1793. Mr. J. Mackay. Marshes near Aberdeen. Professor Beattie.

Radix fibrosa. *Culmus* erectus, 2—4-pedalis, triqueter, lævis, infernè foliosus. *Folia* erecta, latiuscula, lætè viridia, lævia, longissimè vaginata; superiora margine aspera. *Bractææ* foliaceæ, erectæ, culmum superantes, acuminatæ, acumine aspero, vaginis longissimis, pedunculo tamen brevioribus, supremis quandoque brevissimis et ferè nullis. *Spicæ* cylindraceæ, elongatæ, acutæ, graciles, erectæ; masculæ sæpiùs duæ, glumis lanceolatis acutis, frequentius mucronulatis; fœmineæ duæ vel tres, longissimè pedunculatæ, pedunculis capillaribus, læviusculis, glumis lanceolatis, mucronulatis, ferrugineis, dorso viridibus, mucrone scabro. *Stigmata* tria. *Fructus* glumis longiores, lanceolato-triquetri, erecto-patentes, nervosi, haud inflati, virides, glabri, in rostrum attenuati compressum, apice profundè bifurcum. *Semen* fructum implens, triquetrum, breve, fuscum, pedicellatum.

I cannot refer this to any species already described. For some time I was in danger of confounding it with *C. vesicaria* in a young state, but the repeated admonitions of Mr. Mackay warned me. Having examined it in various states, I have no doubt remaining.

Its

Its long *vaginæ*, and the fruit being not inflated but filled with the large seed, distinguish it from *vesicaria* and *ampullacea*. It agrees in many particulars with *sylvatica* and *strigosa*, but differs in having more than one male spike, as well as much thicker and denser female ones.

I know of no figure of this species, nor of *C. binervis*; but as I hope to procure fresh specimens for publication in *English Botany*, I decline offering any delineation of dried ones. A figure of a *Carex*, in order to be useful, should exhibit the fructification in various states, and express particularly the form, surface, and nerves of the *arillus*, and the shape of the seed.

XXIX. *Additional Note to the Remarks on the Nature and Propagation of Marine Plants*, p. 145.

By Lieutenant Col. Thomas Velley, F.L.S.

Read December 3d, 1799.

COLONEL VELLEY wishes to explain a passage that possibly may be subject to misconstruction in his paper, p. 154. It is there observed that the central substance in *Fucus ferratus* is never converted into mucilage. His meaning is, that it does not dissolve, as in *F. vesiculosus*, leaving the pericarps enveloped in a filamentous substance. The *F. ferratus* certainly produces a mucilage in its summit, as well as in every other part of its frond at certain periods ; and from the indiscriminate situation of this fluid, an argument may arise against its peculiar reference to the faculty of impregnation, which is confined merely to the summit of the plant.

XXX. *Ad-*

XXX. *Additional Note to the Observations on the British Species of
Mentha*, p. 171.

By James Edward Smith, M.D. F.R.S. P.L.S.

Read December 3d, 1799.

ON cultivating a root of Mr. Sole's *Mentha pratensis*, sent by himself, I have found it turn out exactly my *rubra*; and indeed, on an accurate re-examination of his original dried specimen, I find no reason to doubt its being truly the *rubra*. To this species therefore I would wish to refer it instead of *gracilis*; see p. 210 of the present volume.

Since the printing of this paper I have met with fresh reasons for believing the *Mentha sativa* and all its varieties to form one species with the *hirsuta*; and in the *Flora Britannica*, now in the press, I have accordingly united them.

XXXI. EXTRACTS from the MINUTE BOOK of the Linnean Society.

April 3, 1798. **A**N account of the *Ardea Gardeni*, Gmel. Syst. Nat. v. I. 645, having been shot in Oxfordshire by John Horatio Dickinson, Esq. F.L.S. was communicated to the Society.

Nov. 6. The Rev. Mr. Abbot, F.L.S. informed the Society of his having taken the *Papilio Paniscus* (*Hesperia Paniscus*, Fab.) in Clapham-Park Wood, Bedfordshire. He observes that "this *Papilio* is most easily taken in May and " June, when the *P. Lucina*, or Duke of Burgundy Fritillary, " is out; but the term of its existence seems to be longer, " as some specimens have been caught, in good condition, " a full fortnight after the *Lucina* has disappeared. It is " to be found from 7 to 9 o'clock in the morning; very " often playing in pairs just after sun-rise, or at least as " soon as the morning fog has evaporated. Its flight is " extremely short, very near the ground. It delights to " settle on the blades of very long Grasses or *Carices*, and " is far from being a timid insect." Mr. Abbot wishes to name it the Duke of York Fritillary. With its *larva* and *pupa* he is unacquainted.

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ERRATA in VOL. IV.

- Page 172, line 4 from the bottom, before "peculiar" insert "any."
 176, line 6, for "uropæi" read "Europæi."
 178, line 15 and 16, for "superiùs" and "inferiùs" read "superius" and "inferius." The same errors again occur p. 180 and 183.
 180, line 20, &c. read thus "foliolis nunc bifidis, laciniis angustissimis æqualibus; nunc lanceolatis, integris, vel uno latere incis.".
 209, line 6, for "son" read "son'."
 229, line 25, for "in what darkness we were before" read "where we were in darkness before."
 231, line 20, for "exuvia" read "exuviae."
 232, line 17, for "linearis" read "linearem."
 line penult. for "to" read "into."
 235, Note, line 3 from the bottom, for "felicitates" read "felicitatis."
 line penult. for "pulchredine" read "pulchritudine."
 251, line 8, for "extended" read "extend."
 256, line 3 from the bottom, instead of the semicolon put a comma, and for "for" read "as."
 258, line 23, for "having, besides something similar to it," read "have something similar to it, namely."
 265, line 4 from the bottom, for "acuminatæ" read "acuminatæ."
 269, line 16, for "saturatæ" read "saturate."

Tab. 19. No. IV. Fig. I. The feeler to which the letter *a* was intended to refer is not engraved.

22. Pausus microcephalus.

Fig. 4. The dotted lines (*b*) should have been drawn to the tops of the lower joints; and the dotted lines (*f, f*) should have been drawn farther into the jugular triangle.

Fig. 5. For "*b*" read "*c*," and for "*c*" read "*b*."

For "microcephalus" read "microcephalus."

Pausus Sphærocerus.

Fig. 3. For "*b*" read "*d*," and for "*d*" read "*b*."

Fig. 6. For "*b*" read "*c*," and for "*c*" read "*b*."

For "sphærocerus" read "sphærocerus."

VOL. V.

- Page 4, line 21, the words "*aperturæ margini reflexâ*" are improperly printed in italics.
 9, line 4, for "issued" read "issue."
 12, line 18, after "dilated" insert a comma.
 19, lines 25 and 26, for "the boat" read "a boat."
 33, line 1, read "base of the upper mandible," &c.
 149, line 26, for "directs" read "direct."
 151, line 2, for "position" read "structure."

Directions for placing the Plates of the FIFTH VOLUME.

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